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CONTENTS

The Mother of Rivers—The Great Columbia Ice Field of the Canadian Rockies
With 62 Illustrations LEWIS R. FREEMAN

The Land of the Yellow Lama
With 40 Illustrations JOSEPH F. ROCK

The National Geographic Society's Yünnan Province Expedition
With 5 Illustrations GILBERT GROSVENOR

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TO carry out the purposes for which it was founded thirty-seven years ago, the National Geographic Society publishes this Magazine. All receipts are invested in the Magazine itself or expended directly to promote geographic knowledge.

ARTICLES and photographs are desired. For material which the Magazine can use, generous remuneration is made. Contributions should be accompanied by an addressed return envelope and postage.

IMMEDIATELY after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. Four expeditions have followed and the extraordinary scientific data resulting given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fissures. As a result of The Society's discoveries this area has been created a National Monument by proclamation of the President of the United States.

AT an expense of over $50,000 The Society sent a notable series of expeditions into Peru to investigate the traces of the Inca race. Their discoveries form a large share of our knowledge of a civilization waning when Pizarro first set foot in Peru.

THE Society also had the honor of subscribing a substantial sum to the expedition of Admiral Peary, who discovered the North Pole.

NOT long ago The Society granted $25,000, and in addition $75,000 was given by individual members to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people.

THE Society is conducting extensive explorations and excavations in northwestern New Mexico, which was one of the most densely populated areas in North America before Columbus came, a region where prehistoric peoples lived in vast communal dwellings and whose customs, ceremonies, and name have been engulfed in an oblivion.

THE Society also is maintaining expeditions in the unknown area adjacent to the San Juan River in southeastern Utah, and in Yunnan, Kweichow, and Kansu, China—all regions virgin to scientific study.

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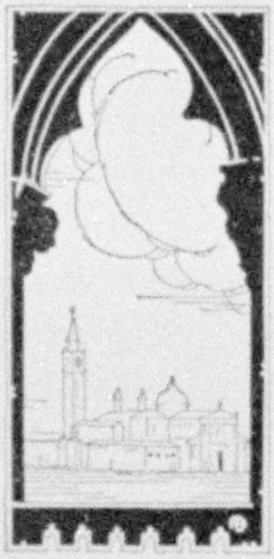

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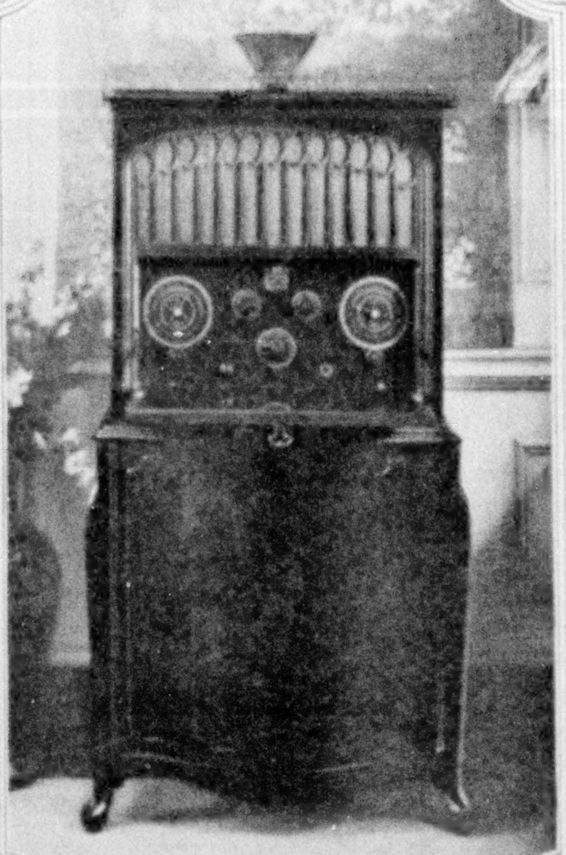

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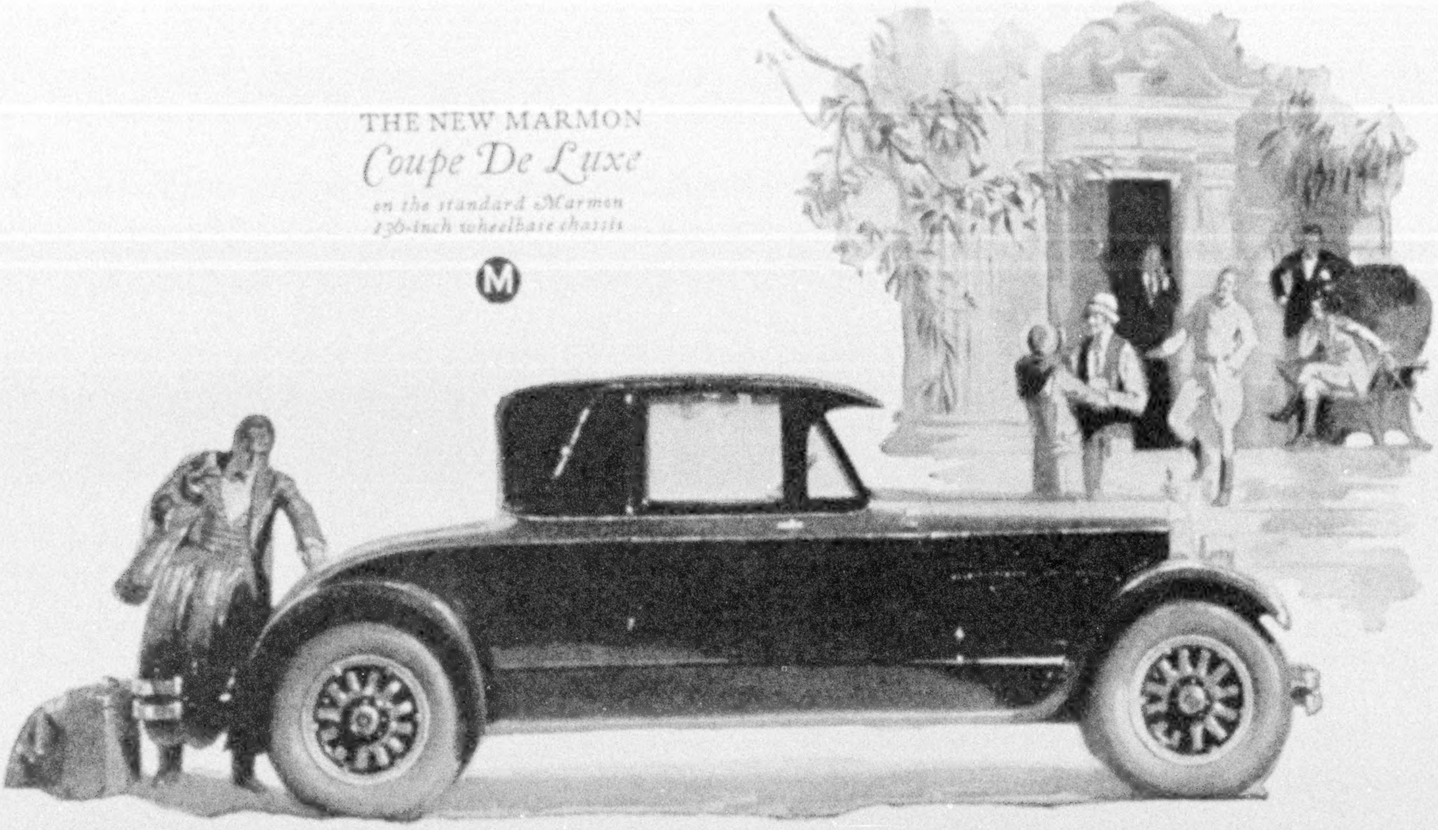

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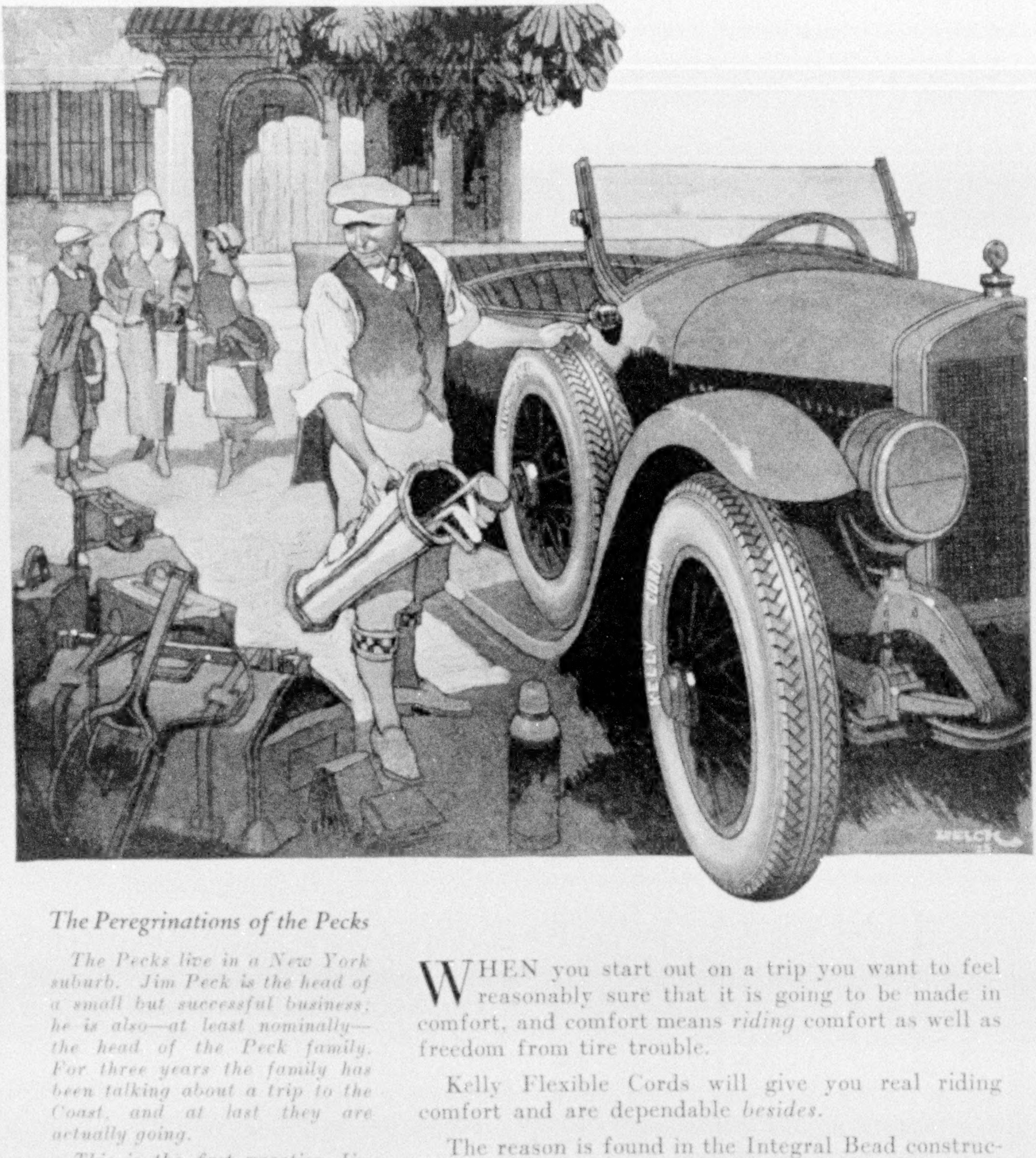

The Peregrinations of the Pecks

The Pecks live in a New York suburb. Jim Peck is the head of a small but successful business; he is also—at least nominally—the head of the Peck family. For three years the family has been talking about a trip to the Coast, and at last they are actually going.

This is the first vacation Jim has taken in five years. Changing tires on the road is one of the things he is NOT planning to do, hence the Kellys.

In subsequent issues of this magazine we shall meet the Pecks on their travels.

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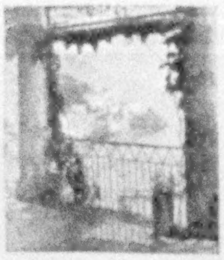

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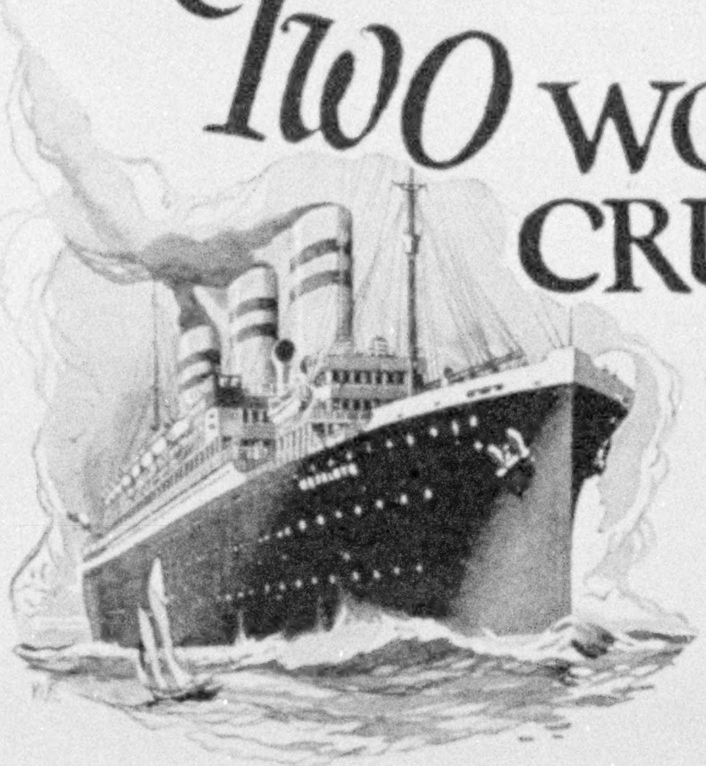

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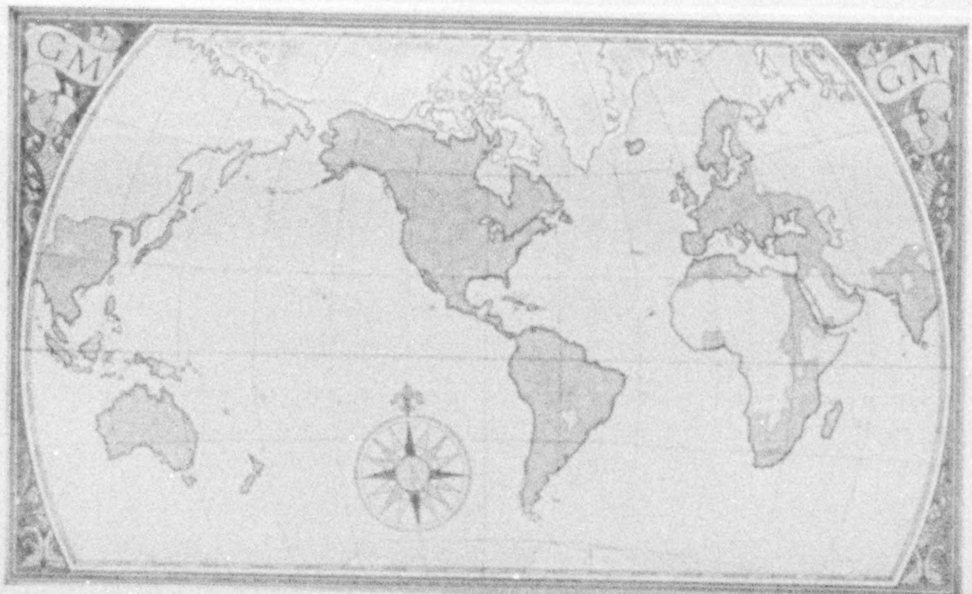

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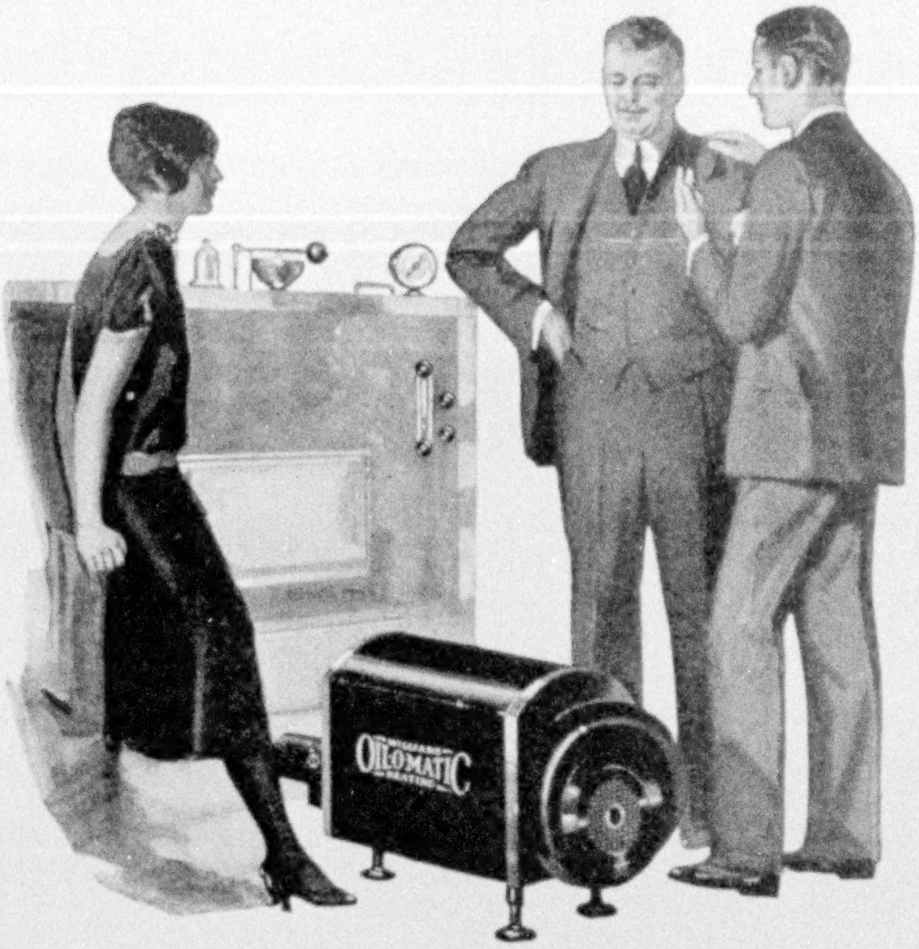

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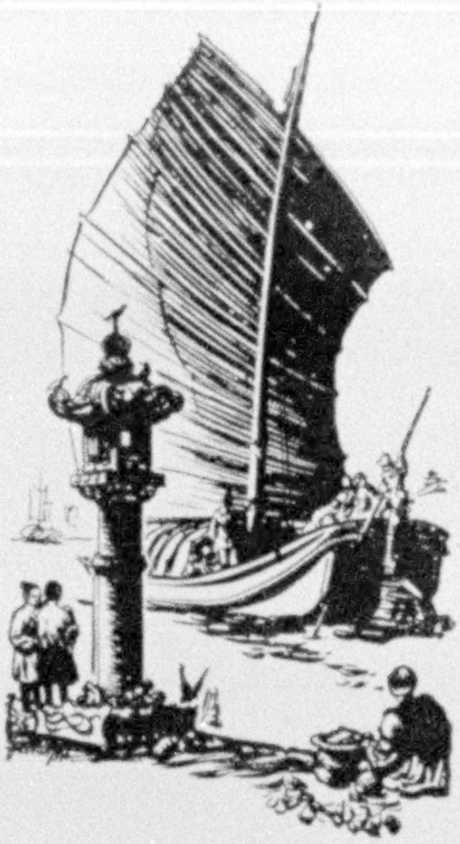

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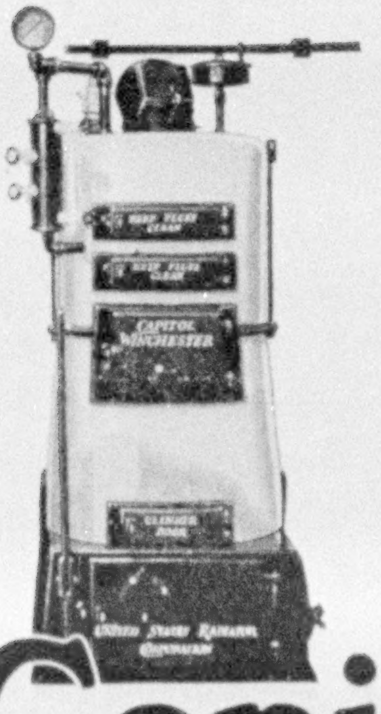

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As you appreciate more fully the beauty and purity of the "singing" tones of the KIMBALL Piano, you feel drawn into closer intimacy with those great artists of past and present who have expressed unqualified approval of this world-renowned instrument.

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A KIMBALL Grand or Reproducing Piano—an Upright or Player—exactly suited to your preferences. Ask for catalog.

W. W. KIMBALL CO.

Established 1857

321 Kimball Building Chicago, Illinois

For Easter

The nicest gift to your dear ones
To bring the most priceless message—Flowers.

For birthdays, anniversaries, any occasion, Flowers will tell your story in the most appropriate way.

On steamers, our Flowers, arranged to stay fresh throughout the voyage, repeat your message of love and good wishes every morning!

In New York we deliver within the hour—in any other city as quickly as our wire reaches one of our 3,000 branches.

Place order by wire or letter, state the occasion, give price limit, and leave selection to us!

Orders filled from $5 up.

Current price list on request.

MAX SCHLING INC.

"The Telegraph Florist of New York"

785 FIFTH AVE. at 60th St.

Telephone Regent 8060.

The Reason Why of Cunard Cabin Steamers!

True to its old tradition and aim to sense and meet the wishes of the travelling public at all times, the Cunard Company has now incorporated in its fleet a number of fine, unsurpassingly well-equipped cabin steamers. These ships provide a

Regular Service from NEW YORK to
PLYMOUTH — CHERBOURG — SOUTHAMPTON — LONDON;
QUEENSTOWN (COBH) LIVERPOOL;
LONDONDERRY—GLASGOW

Fares range from $130.—up

A maximum of comfort at a minimum of cost.

The Cunard Cabin Fleet consists of such well-known, oil-burning steamers as:

CARONIA CARMANIA AURANIA ANDANIA
LANCASTRIA COLUMBIA ASSYRIA

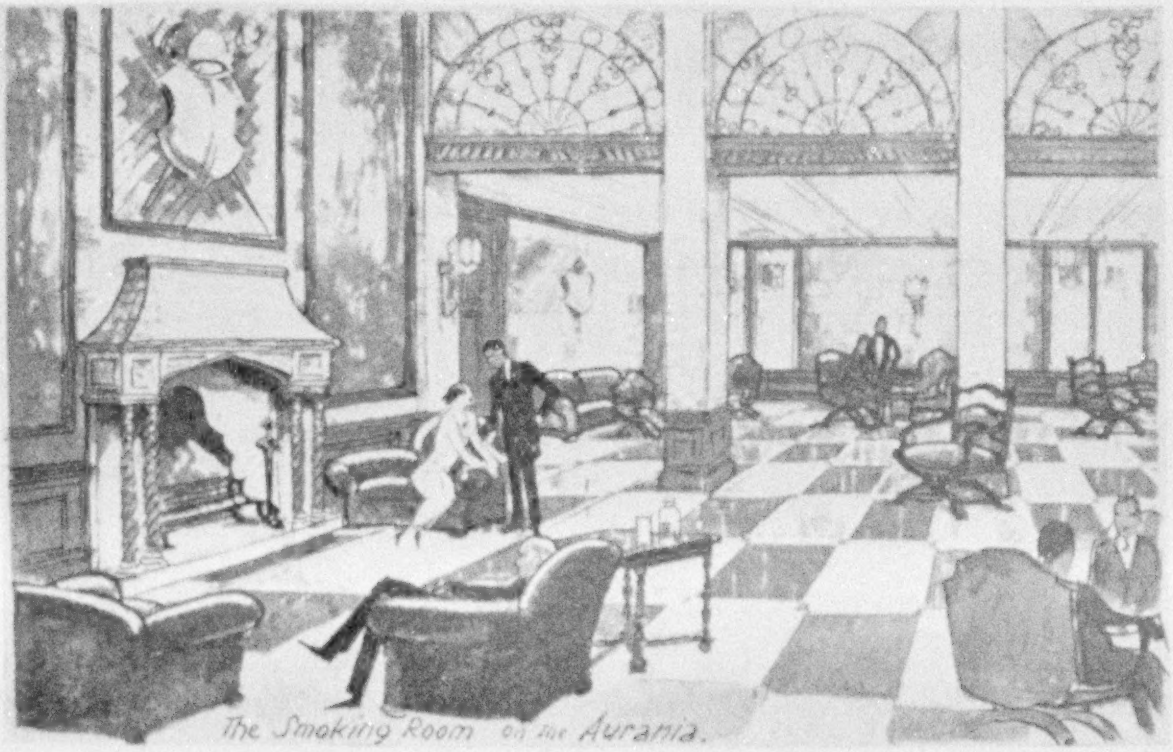
Up to date in every respect, these ships have spacious, tastefully decorated and furnished dining rooms, reading rooms, smoking rooms and lounges.

The staterooms are particularly comfortable, roomy, excellently lighted, perfectly ventilated; many have private baths.

The cuisine and service is of the usual *world-renowned* Cunard standard.

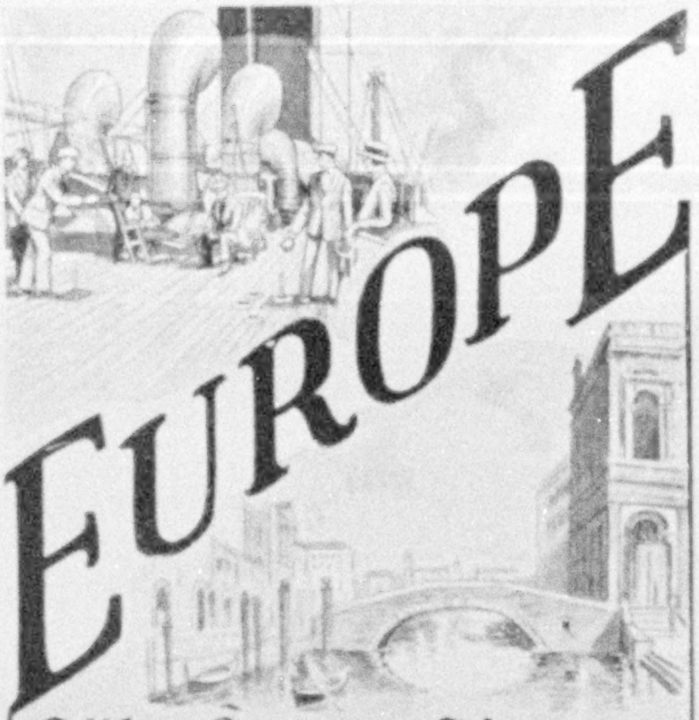
CUNARD
and ANCHOR Lines

25 Broadway New York
or Branches and Agencies



The Smoking Room on the Aurania.

EUROPE



Why Stay at Home

—when you can enjoy your summer holiday, at practically no greater cost, amid always entertaining and really refreshing sights and scenes? COOK'S will enable you to travel just how and where you want to go, in the most comfortable, economical way.

Special itineraries for individuals, families and small parties.

Escorted tours at frequent intervals throughout Spring and Summer seasons via North Atlantic and Mediterranean.

Complete series of tours of varying lengths.

Special Cruise Tours to Norway, North Cape and Northern Capitals.

Annual Summer Cruise
around the
MEDITERRANEAN
on the **S. S. TUSCANIA**
of the Cunard and Anchor Lines
July 4, to Sept. 3
From New York back to New York

A Magnificent Itinerary
Limited Membership
Popular Fares

THOS. COOK & SON
NEW YORK

Boston
Philadelphia
Chicago St. Louis
San Francisco Los Angeles
Toronto Montreal Vancouver

BOURNEMOUTH

England's Garden City by the Sea

IN "Tess of the D'Urbervilles" a town called *Sandbourne* is described by Thomas Hardy as "a fairy place suddenly created by the stroke of a wand . . . a Mediterranean lounging place on the English Channel."

This is really meant to portray *Bournemouth,* a popular seaside resort near Southampton and about 2 hours' train journey from London, which has grown into great favour with American visitors to England.

It is a modern city of garden-surrounded mansions, fine hotels, and lovely promenades, with all the amenities of an up-to-date holiday resort. It is a place of unique charms and beauty, and a centre for excursions to many of the most interesting historic spots in England, such as Corfe Castle and Stonehenge.

Within a 30-mile radius 2,000 years of history are enshrined. The scenes familiar to readers of Thomas Hardy's novels are virtually at its door. The region abounds in lovely old-world villages and remains of the Roman occupation and the Norman conquest.

Christchurch, famous for its historic old Priory church, a remarkable Norman relic of the 12th century, and a Mecca of pilgrimage, is practically next door to Bournemouth. Several famous cathedrals and abbeys — Winchester, Salisbury, Wimborne, Romsey, Beaulieu—are within a day's motoring tour. The New Forest, in days of old the hunting ground of Norman Kings, is within half-an-hour's motor run.

Although Bournemouth was but a tiny fishing hamlet a little more than a generation ago, the manifold charms of its locality have resulted in its development as one of the principal seaside resorts of England, with a population of something like a hundred thousand.

American tourists to England will find it a most delightful place to spend a week or two.

A copy of the town's official guide, with maps and illustrations and the fullest information with respect to hotels and boarding houses, may be obtained from the Town Clerk, Town Hall, Bournemouth.

The Eversharp point cannot wobble or turn

EVERSHARP is different in principle. It has the *rifled tip.* This tip grips the lead at the point. The lead cannot wobble or turn. So Eversharp writes as smoothly as a wood pencil.

Also it is *ever sharp.* Practically indestructible. Handsome and handy.

Today, the new, *perfected* Eversharp is rapidly adding to the twenty million present Eversharp users.

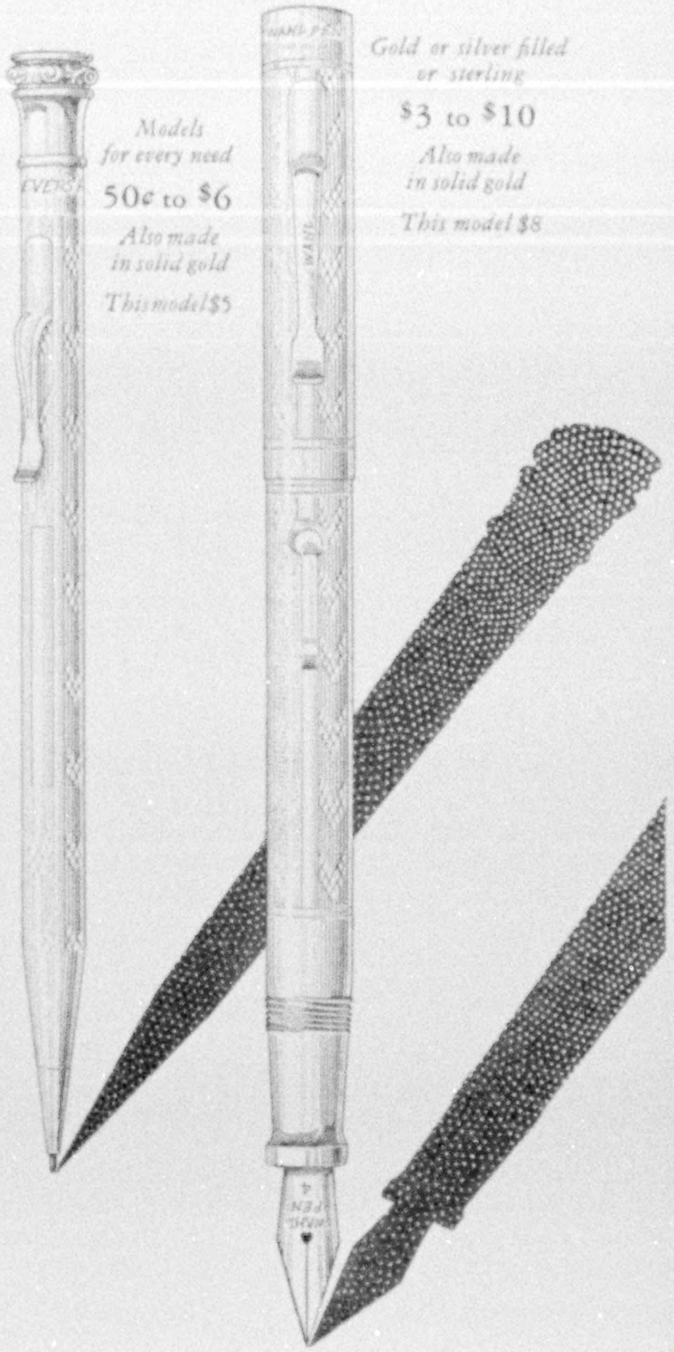
It does not clog or jam. Reloads in a second. Is made with the precision of a watch.

There is an Eversharp fitted to be your companion in success.

Perhaps an Eversharp in working togs at $1 or less. Or probably a gold-filled or sterling model—harmonizing with your watch and other personal articles—$3 to $6.

Out of all the Eversharps priced up to $45, one is certain to be *your* pencil.

Thirty thousand Eversharp dealers are ready to help you select. Several are conveniently near.



Models for every need

50¢ to $6

Also made in solid gold

This model $5

Gold or silver filled or sterling

$3 to $10

Also made in solid gold

This model $8

The *New* WAHL

EVERSHARP

PERFECTED

Wahl Eversharp and Wahl Pen
Made in U. S. A. by The Wahl Co., Chicago
Canadian Factory, The Wahl Co., Ltd., Toronto
Prices same in Canada as U. S.

Wear-proof — unbreakable and an Ivory-smooth Point

The barrel of a self-filling pen is not an ink fount, but a case to hold the nib and protect the soft rubber ink sac which actually contains the ink supply.

The beautiful metal barrel of the Wahl Pen is strong as steel and its thin walls allow space for a much larger ink sac. Ink capacity is far greater than the ordinary fountain pen.

The nibs of Wahl Pens are the finest product of the jeweler's art. Their iridium tipped points are ivory-smooth. And no nib in the world will outwear them.

Your dealer can show you a Wahl Pen to match your Eversharp. Carry both and be sure you are right in your writing equipment.

Red Top Leads are the smoothest quality—perfect in size, and economical. Made in black (7 grades), red, blue, green, yellow, purple copying. At all dealers.

WAHL PEN

Seattle
—One of the World's Remarkable Cities

SEATTLE is the hub city of what globe-trotters have called the world's most remarkable summer playground.

Within a few hours of this wonder city—which Ezra Meeker, of "Covered Wagon" fame, has seen grow from 80 pioneer souls to a world center of 400,000 people—you can enjoy an infinite range of diversified recreation.

Go as easy or as hard as you like. Revel in sea surf, toboggan on snow slopes, explore living glaciers, hike through Alpine-flowered meadows, climb snow-capped Rainier. Or, motor over perfect roads amid scenic glories, sail land-locked seas, fish salt or fresh water, golf on evergreen fairways.

It is *never* too hot in Seattle; the Japan Current takes care of that! Summer average, 62 degrees. Pure water everywhere. Make Seattle, Gateway to The Orient and Alaska, your headquarters and plan from ten days to three months.

Write Room 104, Seattle Chamber of Commerce, Seattle, Washington, for free booklet, "The Charmed Land."

[When planning ANY trip to the Pacific Coast, ANY TIME, insist that your ticket agent route you via SEATTLE. Liberal stopovers allowed.]

Seattle

Metropolis of
The Pacific Northwest

"Deadlines"
protect no one against the loss of personal money

Only *known* criminals fear the "Deadlines" of the police. The word has no terror for pickpockets or occasional pilferers, who are the cause of the greatest number of personal money losses. Working on the street, in stations, or wherever there are crowds, these sneak thieves operate quickly and well—leaving their victims helpless of any redress.

AMERICAN EXPRESS Travelers Cheques

are the only *protecting* "Deadlines." A crook wants cash, not Travelers Cheques. If your cheques are stolen or you lose them, you simply report to the nearest American Express office and your loss has immediate attention.

Think of American Express Travelers Cheques, and *use* them, *not only in traveling,* but to safeguard your personal money wherever you are.

Over $30,000,000 in Travelers Cheques were used last year by *non*-travelers; $150,000,000 were bought by tourists, motorists, and business men traveling in this country; $120,000,000 were carried abroad.

American Express Travelers Cheques are *the best-known and most serviceable form of insured money in the world.* They are acceptable everywhere—good anywhere.

Besides, to carriers of American Express Travelers Cheques is extended the helpful personal service of experienced and locally well-known men in more than 26,700 express offices in the United States and Canada, as well as everywhere abroad.

This service is most appreciated in crises, such as loss of funds, accidents, or other emergencies of the stranger in a strange place.

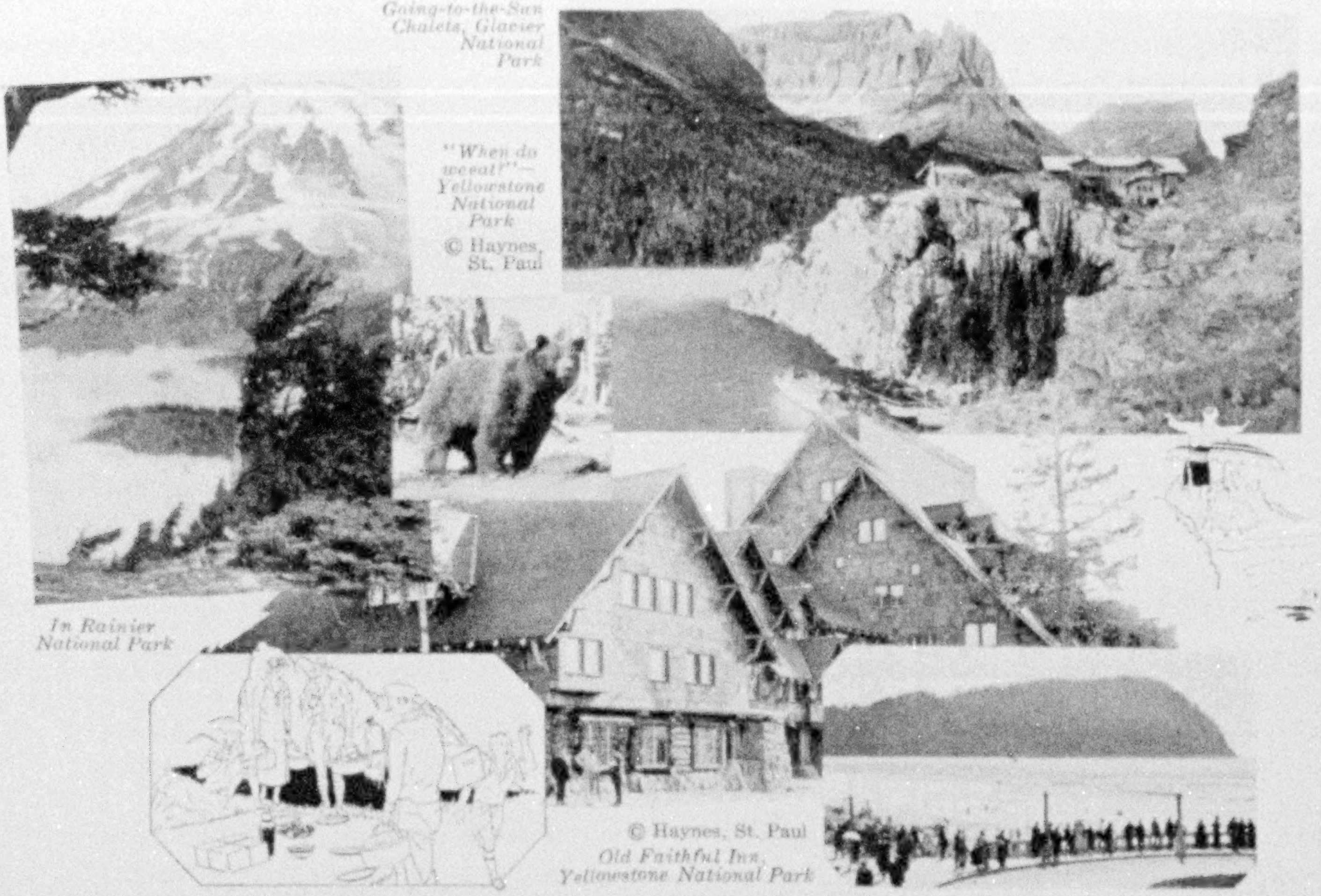
Issued in convenient leather wallets in amounts of $10, $20, $50, and $100, American Express Travelers Cheques are easy to obtain, easy to use, and ease all fear of the safety of your money. The cost is only 75 cents for $100.

FOR SALE AT 22,000 BANKS
AND EXPRESS OFFICES

Secure your steamship tickets, hotel reservations and itineraries, or plan your cruise or tour through American Express Travel Department.

American Express Travelers Cheques

PACIFIC NORTHWEST



Going-to-the-Sun Chalets, Glacier National Park

"When do we eat?"—Yellowstone National Park © Haynes, St. Paul

In Rainier National Park

© Haynes, St. Paul Old Faithful Inn, Yellowstone National Park

Summertime draws thousands to Oregon's famous beach resorts

America's Summer Wonderland
calls you to a great adventure

Out beyond the world of humdrum lies a land of high adventure. It starts at the Rockies—it ends at the Pacific beaches. And in between a thousand vacation wonder-spots are calling you this summer.

Pack your bags, board a train, forget awhile the world of cluttered desks and household cares! Surrender yourself to the clean, strong spell of the mountains. Refresh your soul in a realm of snow-capped peaks, flower-flooded valleys, gleaming glaciers, sunny beaches.

Every day brings perfect vacation weather. There is glorious sport of every kind—golf, mountain climbing, fishing, motoring, surf bathing, horseback riding, boating. You'll enjoy the splendid cities, the excellent hotels.

Come this summer—and include one or more of these famous scenic attractions:

Yellowstone National Park
Glacier National Park
Rainier National Park
Crater Lake National Park
The Alaskan Tour

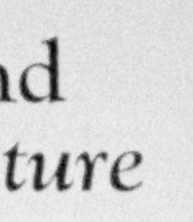
You can visit Yellowstone or Glacier on your way out or back. You can include the famous Cody Road, the Puget Sound country, the Columbia River drive, the Spokane country, or any of hundreds of other vacation attractions.

Low round-trip excursion rates this summer. Through trains providing a service which anticipates your every travel wish. You can go one way and return another. (Through Scenic Colorado at no extra transportation cost.) Stop off where you wish along the way.

Send the coupon now for the new edition of the free illustrated book, "The American Wonderland."

The Chicago Burlington & Quincy R.R.
The Northern Pacific Ry.
The Great Northern Ry.

FREE TRAVEL BOOK

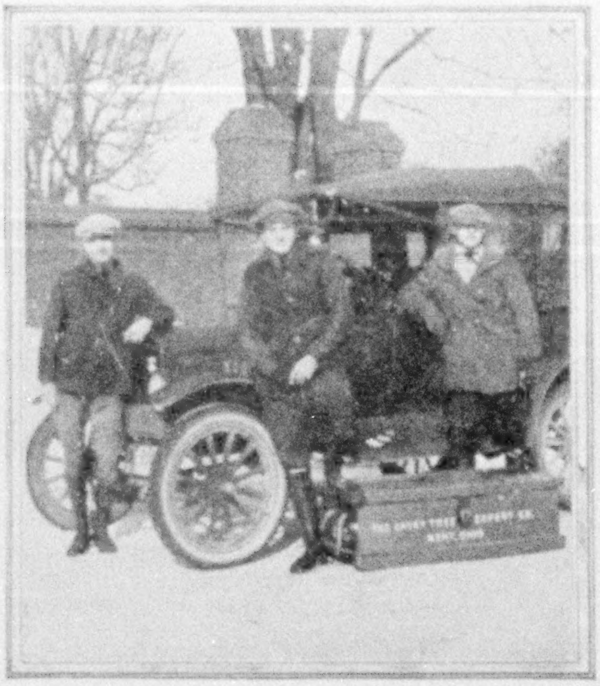


Travel Bureau, Dept. 27-E
Burlington Railroad Building
Chicago, Ill.

Please send me without charge the illustrated book, "The American Wonderland."

Name

Address



There are 500 Davey Tree Surgeons

The only thing that the Davey Company has to sell is the service of expert and reliable Tree Surgeons, whom it has carefully selected, thoroughly trained, and properly schooled. There are no Davey Tree Surgeons except the regular employes of the Davey Company—500 in number.

The selection of these men is an exhaustive process in itself. No men are admitted, no matter how pressing the demand, except those of the right type. Unsatisfactory men are eliminated as quickly as discovered. Consequently, Davey Tree Surgeons are uniformly intelligent, industrious, painstaking, and of high personal integrity.

Davey Tree Surgeons are local to you—anywhere between Boston and Kansas City, between Canada and the Gulf. Write or wire Kent, Ohio.

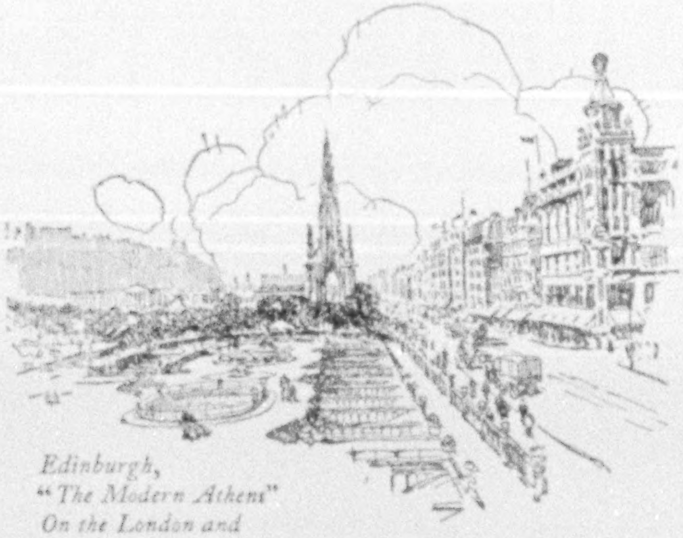
THE DAVEY TREE EXPERT CO., INC.
154 City Bank Building,
Kent, Ohio

Attach this coupon to your letterhead and mail today

JOHN DAVEY
Father of Tree Surgery

THE DAVEY TREE EXPERT CO., Inc., *Reg. U.S. Pat. Off*
154 City Bank Bldg.,
Kent, Ohio

Gentlemen: Without cost or obligation on my part, please have your local representative examine my trees and advise me as to their condition and need.



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"The Modern Athens"
On the London and
North Eastern Railway

Through Britain with the "Flying Scotsman"

The swiftest train over the shortest route from London to Edinburgh, via the London & North Eastern Railway.

Through the wooded hills and green meadows of Middlesex and Hertfordshire; the land of the Pilgrims, where the American Nation was conceived; the Yorkshire Moors and Dales; the Northumberland Fells; into the wild beauty of the Scottish Highlands.

It traverses the scenic, historic route—through a country richer in cathedrals, castles, abbeys and historical remains than any other in England and Scotland.

The London & North Eastern Railway's Royal Mail Routes, via Harwich form the ideal link between England and Continental Europe.

Make your trip through Britain a "LONDON NORTH-EASTERN" tour. Save time and money, and still see everything that matters. Let the "LONDON NORTH-EASTERN" American representative plan the details for you. Intensely interesting illustrated booklets for the asking. Communicate with

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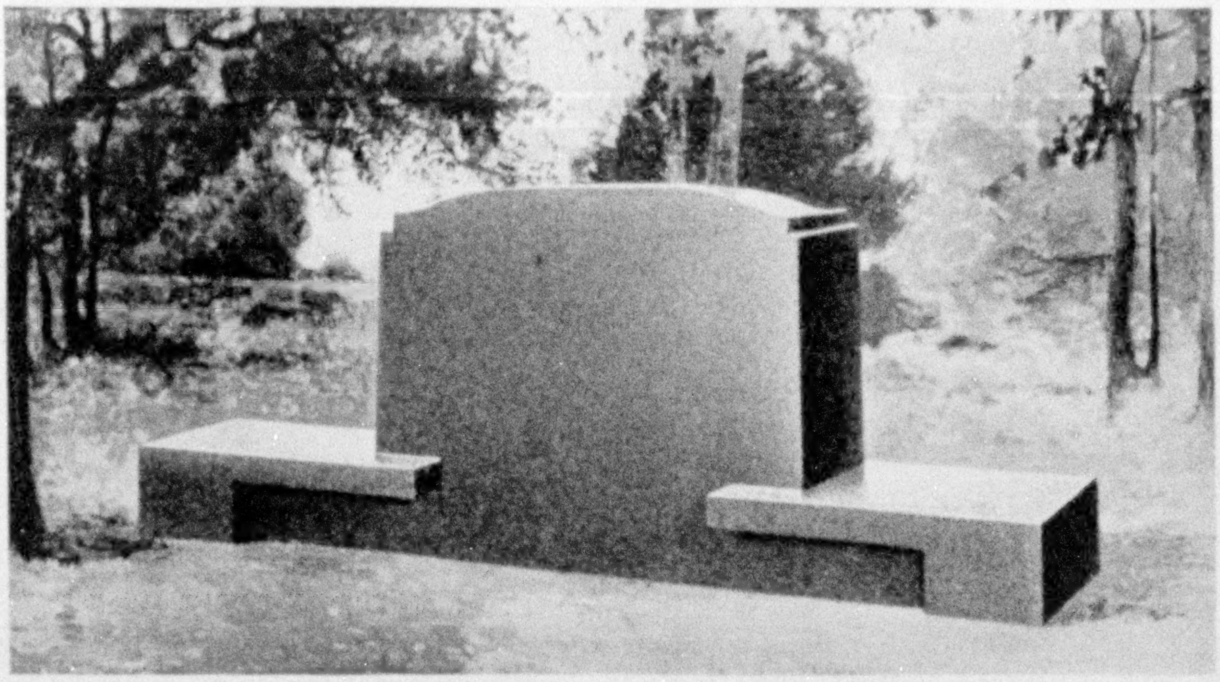
OF ENGLAND AND SCOTLAND



Will Memorial Day See Your Family Monument Erected?

MAY 30TH will mean more to you if you have chosen a memorial in beautiful and everlasting

ROCK OF AGES GRANITE

Your family name would be honored and perpetuated for all time when graven in this magnificent granite. Rock of Ages is fine grained and of a natural blue-gray color. Polished, it takes on a wonderful brilliance. Resolve to erect your family memorial while you live—and let the granite be Rock of Ages.

BE sure to insist upon our Certificate of Perfection when placing order with your local memorial merchant. It is your protection against inferior granite. There is no substitute for Rock of Ages.

Let us send you our illustrated Booklet "E"

ROCK OF AGES

BOUTWELL, MILNE & VARNUM COMPANY
MONTPELIER, VERMONT
QUARRIERS—ROCK OF AGES GRANITE
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A Glimpse of the Rock of Ages Quarry

Nature's Titanic Summer School—

Rock Island

Cross-sections of a world in its making will lie before you in the stratified faces of towering cliffs and plunging canyons of

Colorado

Majestically-piled rock formations reveal geological history older than the pyramids. Rock Island is the Colorado way to the

Yellowstone

Land of spouting geysers, boiling springs, sputtering "paint pots" and friendly wild life. Also in the same tour

California

with its old Missions, giant redwood trees and tropical fruit groves.

Travel in luxury on the Rocky Mountain Limited to Colorado, or the all-Pullman Golden State Limited to California. Other fast trains on convenient schedules.

low round trip Summer fares

and the expert tour-planning counsel of Rock Island Travel Bureaus—in all principal cities—bring the cost surprisingly low. Go one way—return another. Stop over anywhere.

For free illustrated books and full information, write or mail the coupon.

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Please mail me, without charge, your publication on
☐ California ☐ Colorado ☐ Yellowstone

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Hawaii

Your Dream Trip *this* Summer~

Cool in Summer

In June, July or August you'll sleep under covers every night. Crisp trade-winds blow from northern seas; mercury rarely goes above 85° at Honolulu.

For $300 to $400

you can enjoy a week or two in Hawaii, paying all first-class travel, hotel and sightseeing expense, including the calm, delightful voyage, 5 to 8 days each way in an ocean liner.

An Easy Trip

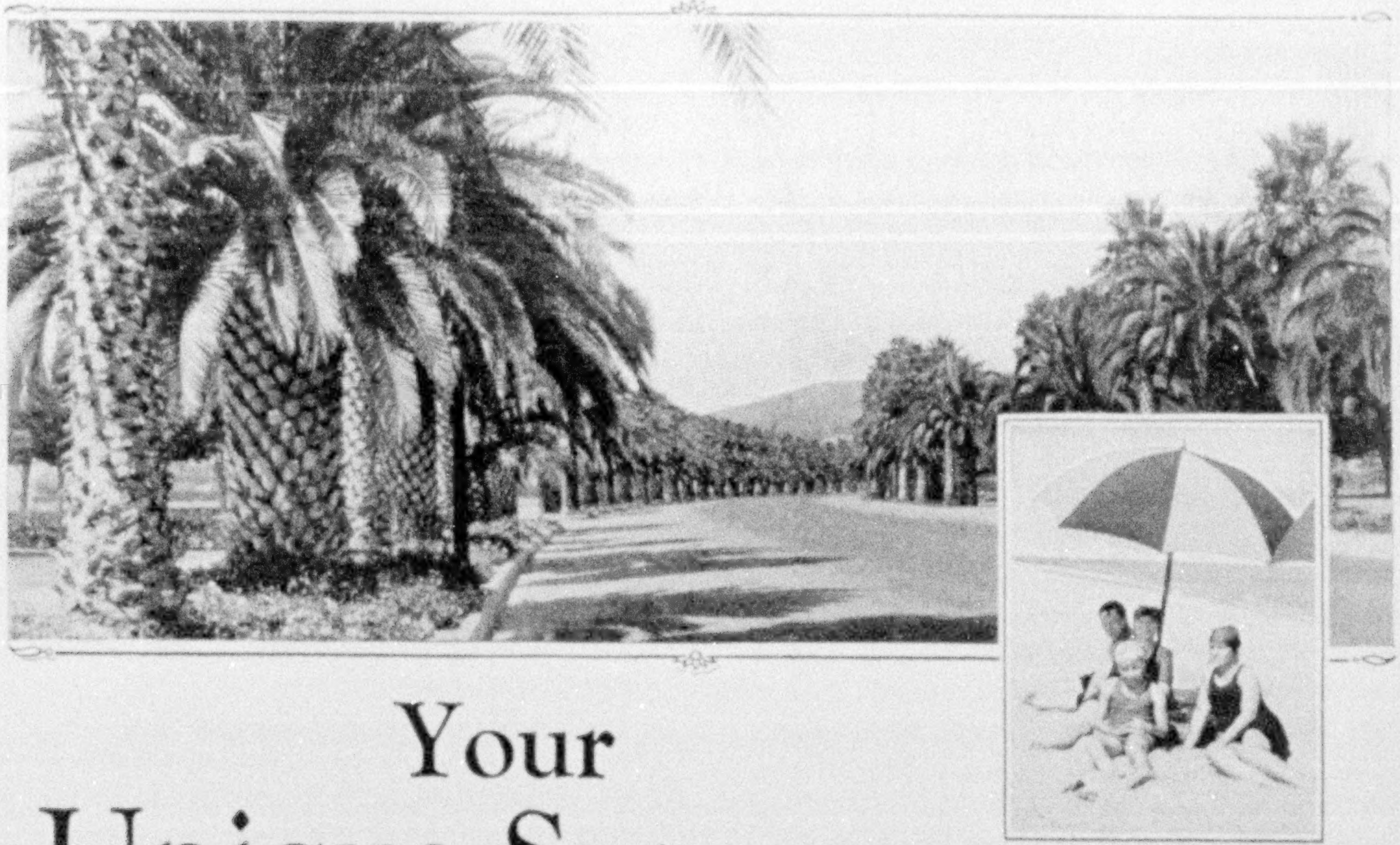
You can make it in 3 or 4 weeks. Your nearest railway, travel or steamship agent will supply literature and data, and book you from your home town direct to Honolulu via San Francisco, Los Angeles, Seattle, Vancouver or Victoria, B. C. Hawaii is a part of the United States with all modern conveniences.

Summer is Gorgeous in Hawaii

Great tropic trees flame in bloom and rare fruits are ripe. Come prepared to relax and rest in an exotic atmosphere—to enjoy all your favorite pastimes and new ones. Ride the flashing surf in outrigger canoe; see native diving boys, the flower lei girls; hear true Hawaiian melody by moonlight.

Volcanic marvels in Hawaii National Park. Good motor roads. Hotels, separate apartments and cottages at reasonable rates. For additional information on that trip and for colored illustrated brochure on Hawaii—write now to

HAWAII TOURIST BUREAU
212 MONADNOCK BUILDING, SAN FRANCISCO
OR 341 FORT ST., HONOLULU, HAWAII, U. S. A.



Your Unique Summer

More Fun Than You've Ever Had. Out of the old rut, into a new environment. A new and lovely country, near yet like a foreign land. New sights, new things to do. New interest. New vim. A Summerland Supreme.

CHANGE is the spice of life. Taste some of it this summer and be rejuvenated, spiritually, mentally, and physically. To do the usual continually is to grow old quickly. To *change* now and then is to retain enchanting youth.

Come and see the Land of Youth called *Southern California*—it's one of the *coolest* summer playgrounds. The U. S. Weather Bureau's figures, not for last year but for *forty-seven* years, show these average mean temperatures in a central (inland) city in this section: 47 Junes, 66 degrees; 47 Julys, 70; 47 Augusts, 71; 47 Septembers, 69. And we promise, too, that you'll sleep *under blankets* nine nights out of ten all summer; and that *no rain* will spoil your fun.

What sport is there?—well, every summer sport that you can think of *at its best*. Golf, tennis, motoring, riding, camping, fishing, hunting, hiking, mountain climbing, ocean sailing, bathing, aquaplaning, aeroplaning—you simply name your own and it is there within your reach.

Old missions, deserts, orange groves, strange flowers, trees and vegetation, lectures, music, art. Or hotels, restaurants and modern dancing to famous orchestras.

Five thousand miles of motor boulevards, paved like city streets, connecting everything. Rest? Within two hours you're in a log cabin among the trees beside a mile-high lake, in the great majestic quiet of the mountains.

Men, women, children—all are captivated because it furnishes what each likes best. Southern California is the land for every age from toddlers to venerable sages, a spot unique in these United States. It's the new height to which you can climb from out of your old rut. Don't pass it by.

Special round-trip low-rate fares from May until October on all railroad lines.

Any ticket agent can tell you all about it. Or mail coupon below to us.

Southern California is the new and interesting gateway to Hawaii.

Plan *now* for *this* summer. The finest trip, the greatest and most beneficial *change* you've ever had. It's grand fun and it pays and you may never have another chance.

All-Year Club of Southern California

ALL-YEAR CLUB OF SOUTHERN CALIFORNIA,
DEPT. 804, CHAMBER OF COMMERCE BLDG., LOS ANGELES, CALIFORNIA.

I am planning to visit Southern California this summer. Please send me your free booklet, "Southern California All the Year." Also booklets telling especially of the attractions and opportunities in the counties which I have checked.

☐ *Los Angeles City and County* ☐ *San Bernardino County*
☐ *Orange County* ☐ *Santa Barbara County*
☐ *Riverside County* ☐ *Ventura County*

NAME ____________________

STREET ____________________

CITY ________________ STATE __________

XUM

A MUTUAL ORGANIZATION—FOUNDED IN 1845

NEW YORK LIFE INSURANCE CO.

(Incorporated under the Laws of New York)

346 BROADWAY, NEW YORK, N. Y.

EIGHTIETH ANNUAL STATEMENT

To the Policy-holders:

I am addressing an audience of about seven and a half million people. I directly address one and one-half million thoughtful men and women each of whom is responsible in some fashion for about four others.

My theme is your relation to each other and to your neighbors through the New York Life Insurance Company.

I assume that mere figures about the Company have ceased to interest you in the old way. Whether we have in assets more or less than a billion dollars or do more or less than seven hundred million dollars of new business in a year is interesting now, chiefly because these once amazing facts tell how widely useful you are as a part of a vast social enterprise which is both beneficent and beneficial.

May I in this year of grace try to give you a new thought about yourselves and—if I may so put it—about your duty to others.

You are the plain people that Lincoln referred to.

Few of you are very rich; few are very poor.

You are always quick to help your neighbor, even at some sacrifice to yourself.

If your neighbor is ill you sympathize with him, and if you know of some way in which you can help him you eagerly offer your services.

If Diphtheria threatens him and his family and you know that he does not understand about the Diphtheria serum, you almost force him to get it and get it quickly.

You do the same about Typhoid or Pneumonia or Scarlet Fever.

If you are a farmer you tell your fellow-farmer of any process you know by which his crop may be increased or how his methods of marketing may be improved.

You are moved by the same impulse if you are a physician or a lawyer or a merchant or a teacher or a mechanic or a clerk or a day laborer.

You do these things spontaneously. You expect no reward. You know your neighbor would gladly do the same for you.

In other words, your neighbors' welfare has become a part of your own life; your welfare is their concern, too.

This we call the milk of human kindness.

You could perform your greatest neighborly service in 1925, almost work a miracle in beneficence, if you would recognize the remedial power of life insurance in your relations with your neighbor. You hesitate because you think that whether or not your neighbor insures his life is his private affair.

Insuring his life is no more your neighbor's private affair than is the condition of his health.

Improvidence is just as real and just as dangerous as Disease. The poverty which follows both is worse than either.

The future welfare of your neighbor's children and his own security in old age are your concern. You have observed the beneficent work of life insurance. Why not talk seriously to your neighbor about what you know?

Has it brought you peace of mind? Tell him so.

Has it taught you to save money? Show him how.

Are you getting more out of life for yourself and your wife because you know your children will be provided for? Explain that to him.

You will generally have a sympathetic auditor because he himself has seen widows saved from dire poverty, families kept together and children educated by life insurance.

You and your neighbor have seen life insurance help your community and State in other ways; by loans on farms, homes, business buildings, the purchase of the bonds of your Town or County or State—through the purchase of Railroad bonds and the bonds of the great public utility corporations that are so rapidly increasing human efficiency and human comfort.

Can you, in short, talk with your neighbor about anything more vital, more in harmony with every neighborly impulse?

Show him how this Company is benefiting him constantly even though he is not a member of it. Tell him that he ought to become a member.

Send for one of our agents. Introduce him to your neighbor.

In brief follow the neighborly impulse here as you would in other things—on the perfectly sound theory that your neighbor's welfare is your concern.

If in 1925 you each did this neighborly act and added one person like yourself to our membership you would about double the outstanding insurance of the Company. This would be a great piece of public service; it would be a fine neighborly thing to do, and it would directly benefit you because, if the Company's outstanding risks were doubled, its fixed charges would relatively decrease, and this saving would lower the cost of your life insurance.

This is a policy-holders' Company. It exists because you are provident. Its strength and security are unrivaled. *Its assets belong to you.*

Your neighbor doesn't clearly know all that. He doesn't realize that you are a joint and several owner of more than a billion dollars. He probably doesn't fully understand what a prudent and desirable neighbor you are.

Tell him all about it.

DARWIN P. KINGSLEY,
President.

Balance Sheet, January 1, 1925

Bonds at Market Value as determined by the Insurance Department, State of New York

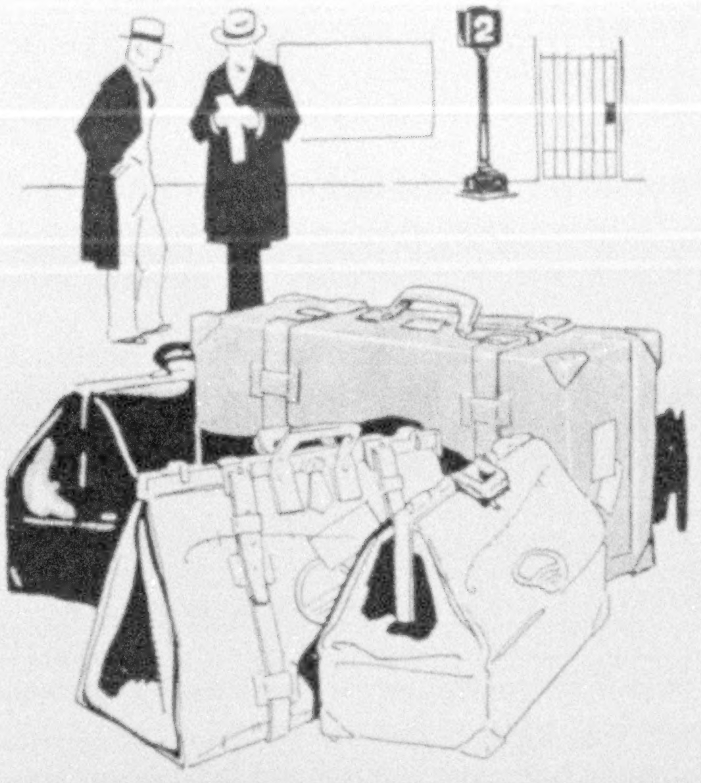
ASSETS

Real Estate Owned	$7,314,032.75
First Mortgage Loans—	
On Farms	68,143,085.50
On Residential and Business Properties	230,422,054.50
Loans on Policies	168,308,446.91
Bonds of the United States	84,354,410.00
Railroad Bonds	303,504,995.93
Bonds of other Governments, of States and Municipalities	109,255,521.45
Public Utility Bonds	43,251,785.00
Cash, including Branch Office Balances	5,804,721.62
Other Assets	35,537,156.76
Total	$1,055,896,210.42

LIABILITIES

Policy Reserve	$820,467,244.00
Other Policy Liabilities	30,952,800.09
Dividends left with Company to Accumulate at Interest	18,126,659.14
Premiums, Interest and Rentals prepaid	2,959,867.36
Taxes, Salaries, Accounts, etc., due or accrued	10,581,658.07
Additional Reserves	10,350,417.00
Dividends payable in 1925	54,136,792.24
Reserved for Deferred Dividends	7,108,161.00
General Contingency Funds not included above	101,212,611.52
Total	$1,055,896,210.42

Outstanding Insurance Dec. 31, 1924	$4,695,000,000.00
New business paid for in 1924	746,000,000.00
Earning power of Assets, including cash in bank, Dec. 31, 1924	5.06%
Investments made in 1924 (excluding Loans on Policies)	122,000,000.00
Paid to and on account of Beneficiaries and Policy-holders in 1924	169,000,000.00



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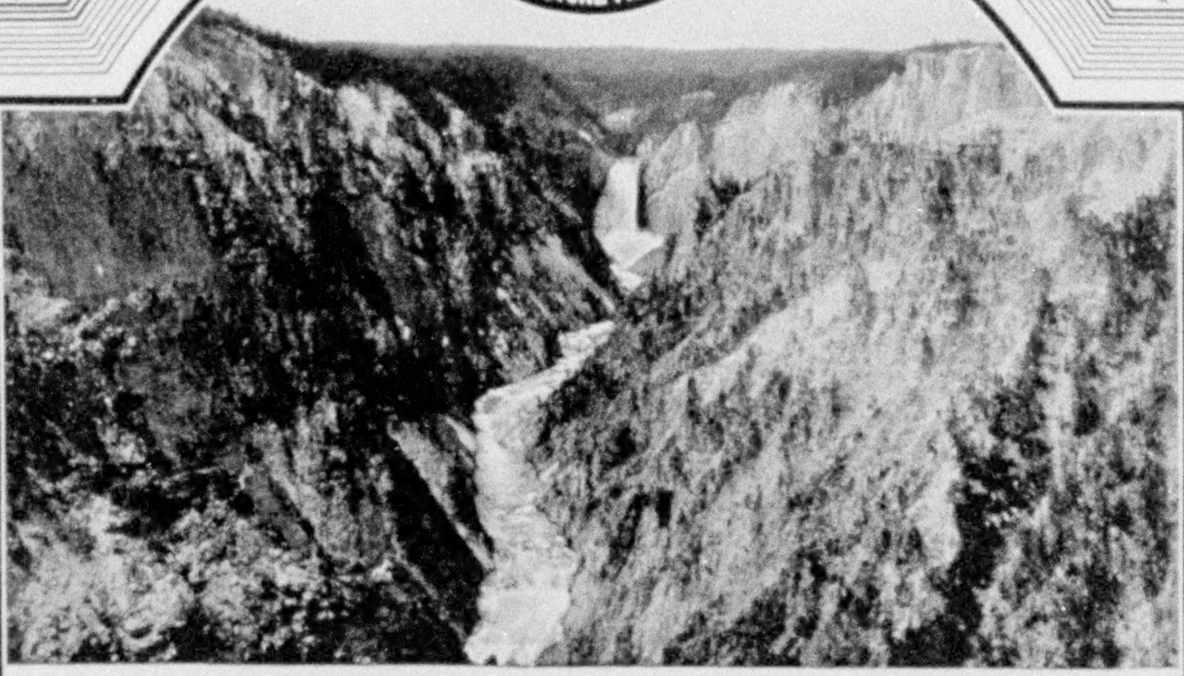

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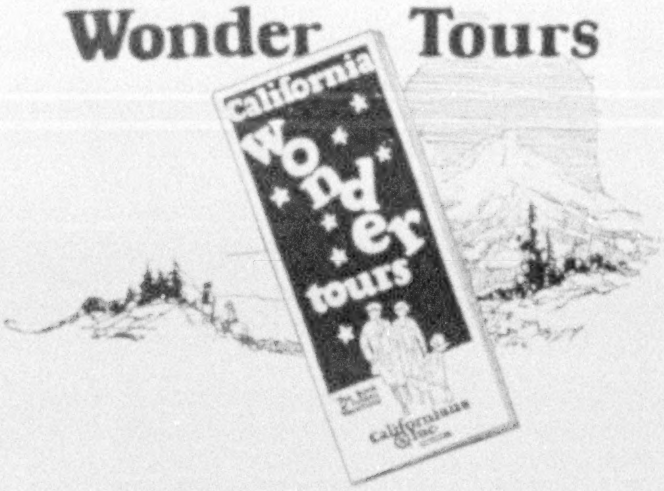

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Watch Their Eyes

NOT so many years ago a boy was born in a luxurious home. His parents tried to give him every advantage that a boy should have. He loved Nature and delighted in long walks in the woods. One day when the boy was about thirteen years old a companion pointed out an interesting object. The boy could barely see it. For the first time he realized that something was wrong with his eyes and he told his father. Then came glasses and constant joy and astonishment at the bright new world with clean-cut outlines. All the wonders of the woods which he never dreamed existed were spread before his happy eyes. Books were no longer pages of letters with fuzzy tails. * * * * This boy was Theodore Roosevelt, who became President of the United States.

If parents such as his never knew that their son had defective vision, can anyone doubt that there are thousands of boys and girls today whose poor sight has not been discovered by their fathers and mothers?

Only 10 children in 100 at the age of nine years have even so-called perfect eyesight. *One* out of every *eight* school children has seriously defective sight or some disease of the eye which needs *immediate* attention.

If your child is the one out of eight whose eyes require attention you ought to know it. You cannot tell from the appearance of the eyes whether they are normal. Many of the eye diseases that lead to blindness are catching. If treated in time they can be cured.

The time to begin to protect the eyes is from the hour the baby is born. See that the doctor or nurse puts a drop of a prophylactic solution into the baby's eyes to prevent the serious disease commonly known as "babies' sore eyes" which often results in blindness.

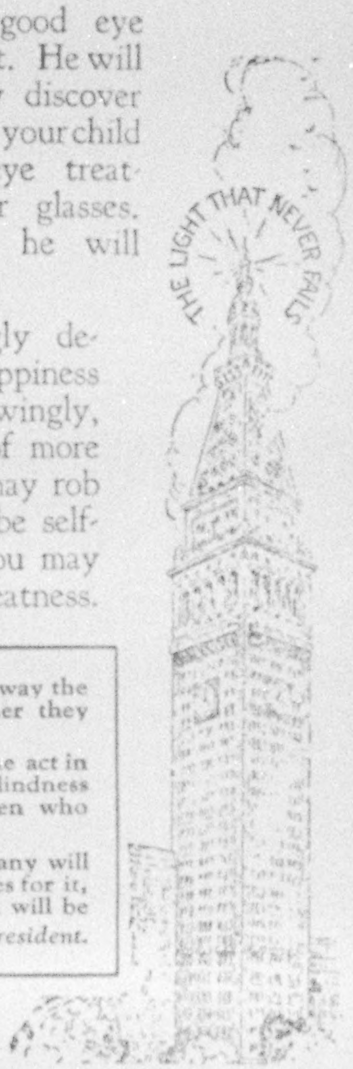
Much of the eye trouble of later years comes from injury in babyhood. Never let the sun shine on a child's eyes—even when asleep. Baby eyelids are not sufficient protection. Diseases of childhood sometimes leave the eyes in a weakened condition. Children's eyes require attention during and after serious illness, especially measles and diphtheria.

Impress upon your boys and girls the danger of using towels that have been used by other people. Try to keep them from rubbing their eyes. Great danger comes from infection and dirt.

Watch almost any group of boys and girls learning to write. Faces turned sidewise, little doubled-up fists clutching pencils within a few inches of their eyes. There is the beginning of eye-strain. Children are frequently accused of inattention and stupidity when the truth is they cannot see clearly.

Get a good eye specialist. He will quickly discover whether your child needs eye treatment or glasses. If glasses are necessary he will prescribe them.

You would not willingly deprive your children of happiness in life and yet, unknowingly, you may deprive them of more than happiness. You may rob them of the power to be self-supporting citizens. You may deny them possible greatness.



There are upward of 100,000 blind people in the United States. According to the National Committee for Prevention of Blindness more than half of them are needlessly blind.

Only 20 of our 48 States have statutes providing for eye tests in schools. Less than one-third of the school children of the entire country have their eyes examined each year.

While parents may not suspect that there is anything wrong with their children's eyes it is sometimes easy for a teacher to detect difficulties. They have an opportunity to watch the way the children use their eyes—to see whether they squint when looking at the blackboard.

Teachers are doing a kindly and humane act in helping to prevent misery and possible blindness when they notify the parents of children who need to have their eyes examined.

The Metropolitan Life Insurance Company will be glad to mail, free to any one who writes for it, a booklet, "Eyesight and Health" which will be found helpful.

HALEY FISKE, *President.*

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VOL. XLVII, No. 4 WASHINGTON APRIL, 1925

THE NATIONAL GEOGRAPHIC MAGAZINE

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THE MOTHER OF RIVERS

An Account of a Photographic Expedition to the Great Columbia Ice Field of the Canadian Rockies

BY LEWIS R. FREEMAN

AUTHOR OF "SURVEYING THE GRAND CANYON OF THE COLORADO," IN THE NATIONAL GEOGRAPHIC MAGAZINE

IT IS a strange fact that one of the first regions of the Canadian Rockies to be visited by a white explorer was also one of the last to be scientifically investigated and comprehensively photographed. This is the land of tall peaks and glacier-choked valleys around the head of the Athabaska River. Here one finds the most striking Alpine scenery of the Western Hemisphere.

David Thompson, the astronomer-explorer of the Northwest Company, who was later to run the Astors so close a race for the establishment of the first fur-trading post on the Pacific coast of what is now Oregon, crossed the Continental Divide during the first decade of the 19th century. He followed the Whirlpool branch of the Athabaska to its head, and descended to the Big Bend of the Columbia by a stream he named the Portage River, now called the Wood (see map, page 382).

The trail thus blazed later became the main transcontinental route of the Hudson's Bay Company traders between the great Canadian plains and their posts on the upper and lower Columbia.

Thus it chanced that a thin, but fairly steady, stream of travel flowed back and forth across the Continental Divide at the head of the Athabaska during the half century or more in which the remainder of the extensive area covered by the Canadian Rockies was rarely visited by white men.

TRADERS AND TRAPPERS FOUND THE EASIEST ROUTE

Intent mainly on finding the lowest passes and the easiest routes of travel, the early traders and trappers must have been almost, if not quite, ignorant of the existence, a few miles to the south, of the most extensive ice field on the continent, outside of the arctic and subarctic regions of the far north.

The Canadian Pacific blasted its way through the Rockies and Selkirks from 80 to 100 miles south of the Columbia Ice Field, while the Grand Trunk—later the Canadian National—found a lower and easier route as far to the north.

Careful studies for both lines added little, if any, knowledge of the still untrodden heights of the ice-locked *terra incognita* between.

Not until the Interprovincial Survey completed its labors along the Continental Divide between Alberta and British Columbia did definite and dependable data on this hitherto almost unknown region finally become available.

Among many valuable geographical and topographical facts revealed by the work of the Interprovincial Survey, per-

Photograph by Byron Harmon

BOW LAKE CAMP, WITH BOW GLACIER ON THE SKY LINE

"Across a milky-jade lake surface gently ruffled by the evening breeze was a wall of ice and rock culminating in the solid mass of Bow Glacier, which reared its bottle-green snout above a gray boulder-fan streaked with glittering runlets of tumbling water" (see text, page 393).

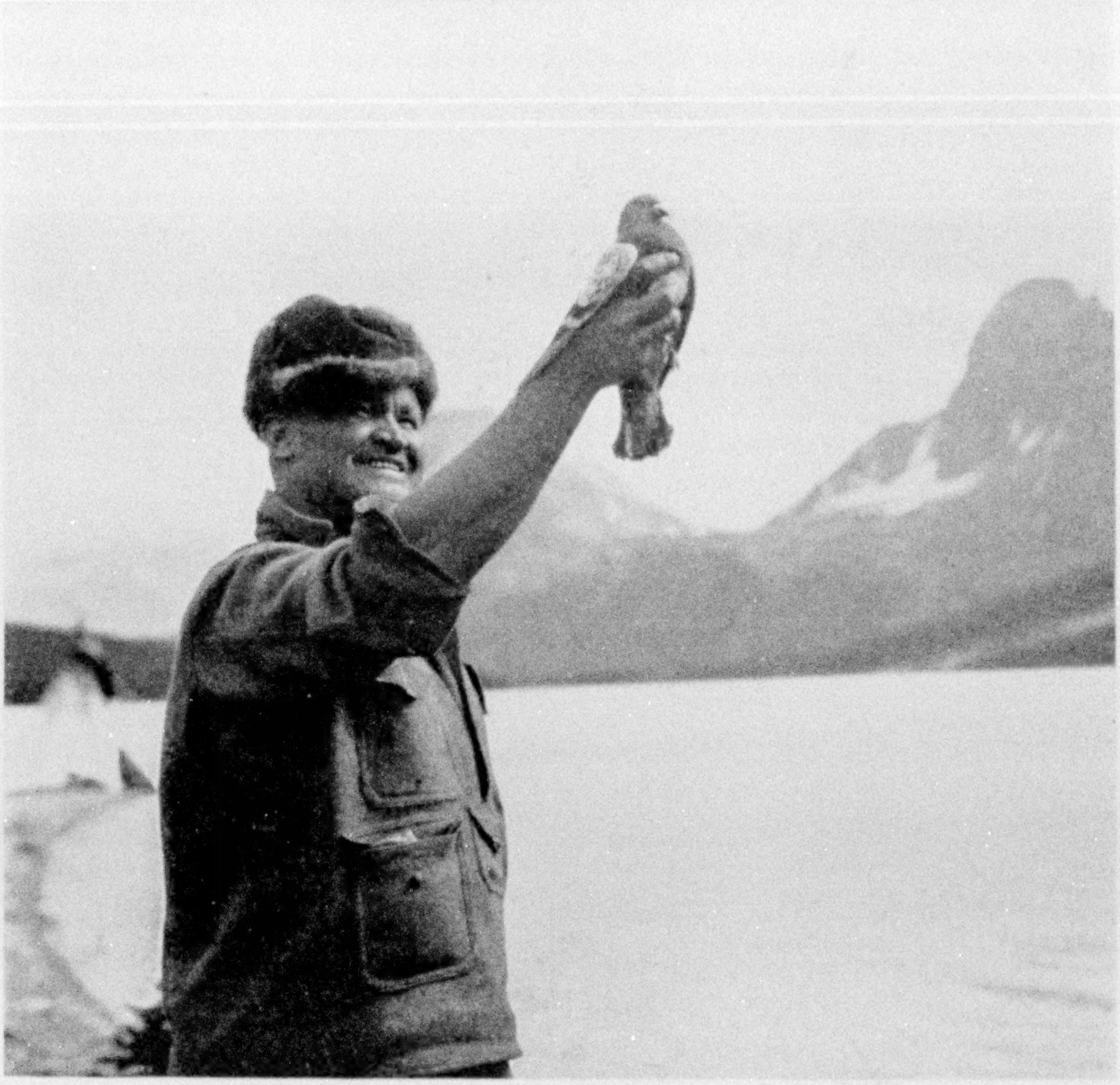
haps none was received with so much surprise and interest, even by those who knew the Canadian Rockies, as the statement that the Columbia Ice Field, formerly not known by name to one person in a hundred thousand, has an area in excess of 150 square miles.

DRAINAGE FROM THE VAST COLUMBIA ICE FIELD FLOWS TO THREE MAJOR OCEANS

Of even greater appeal to the imagination was the revelation of the hitherto little appreciated fact that drainage from this single ice field flows to three major oceans—probably the only instance in the world where such great dispersion of water from a common source occurs.

The Columbia Ice Field may be roughly likened to a stockily built octopus, with the main *mer de glace* forming the body, and the creeping, down-crawling glaciers the tentacles. Surrounded by peaks varying in height from 10,000 to more than 12,000 feet, the ice field itself is comparatively smooth and level. Indeed, many square miles of its center are not more rolling than an undulating plain.

The average elevation, exclusive of the



Photograph by Byron Harmon

THE AUTHOR RELEASING A CARRIER PIGEON AT BOW LAKE

A message was typed on oiled paper and slipped inside the leg ring. A pair of birds was released. They rose for 1,000 feet, then started in the direction of their home cote, but they have never arrived (see text, page 398).

glacier tentacles, which extend down toward the 6,000-foot contour, is about 8,500 feet above sea level. Its greatest elevation is a hummock of 8,884 feet somewhat north of its center.

THE GREAT THREE-WAY SPLIT TO THE ARCTIC, ATLANTIC, AND PACIFIC

Here occurs the remarkable three-way split of continental drainage.

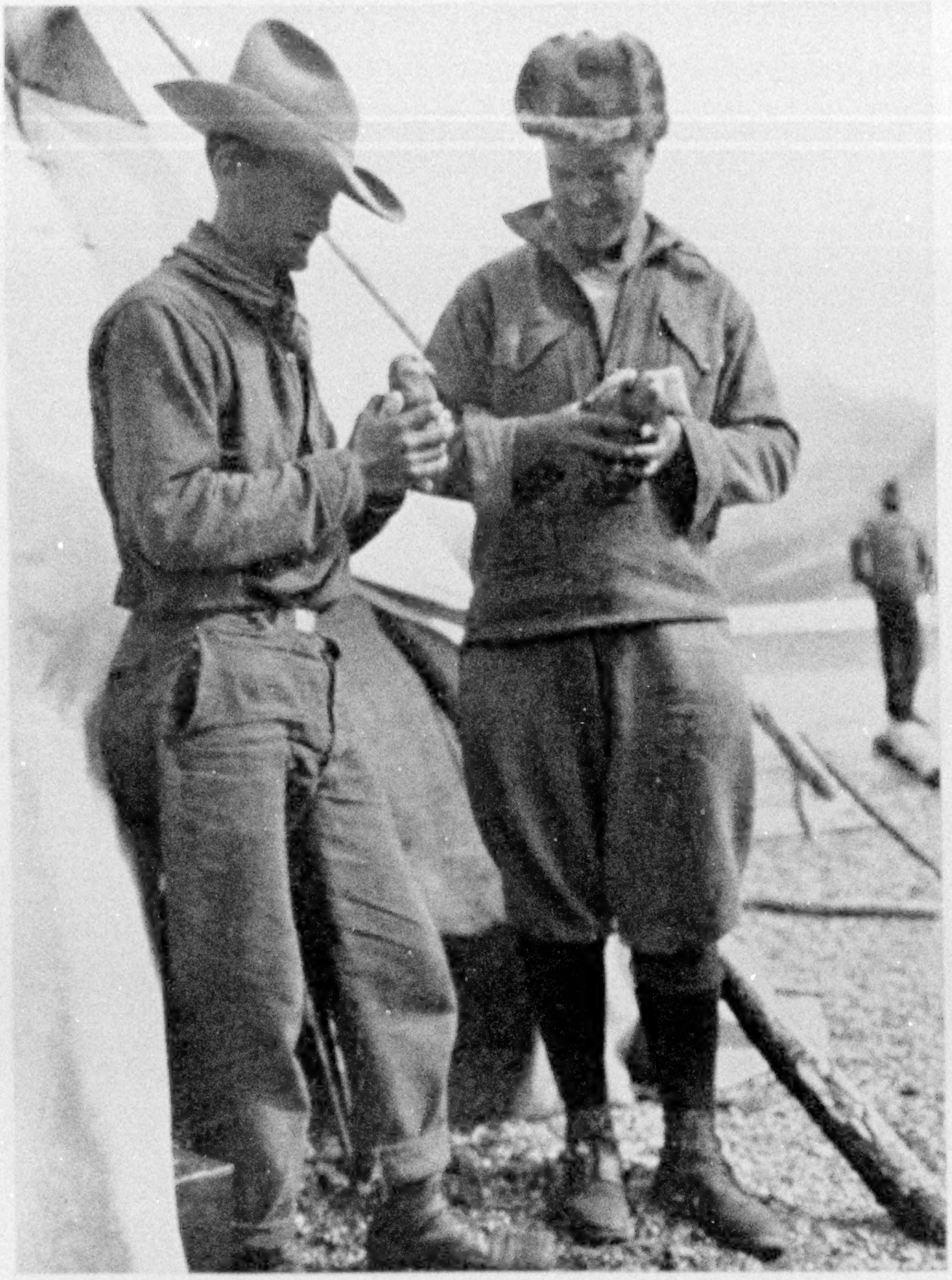
Where the tip inclines westerly, the water runs by the Bush to the Columbia, and thence to the Pacific.

The meltage from the northerly slope may run to either of the main branches of the Athabaska, and so on to Great Slave Lake and down the Mackenzie to the Arctic Ocean.

The eastern and southern slopes drain to separate branches of the Saskatchewan, which, uniting 25 miles below, ultimately mingle with the Atlantic through Hudson Bay.

Striking scenically, unique topographically, and barely explored, the Columbia Ice Field has few rivals in its attractions not only for the alpinist, but also for all lovers of the outdoors.

This article is a workaday account of the first attempt to make a comprehensive collection of photographs, motion and still, of this wild and wonderful region.



Photograph by Byron Harmon

BAPTIE AND THE AUTHOR SUNNING THE CARRIER PIGEONS

The Nature photographer cannot block out a region on the map and say, like the explorer or the surveyor, "When I have covered this area my work is complete." He can cover all of Nature's subjects, but can never reach the end of her moods.

And the recording of moods—the savagery of the mountain torrent which grinds down and engulfs the tongue of forest that blocks its way; the perversity of the peak that hides its head in a veil of cloud—is his most subtle vehicle of expression.

A life-span is all too short for the artist who would picture, either with brush or camera, a land or a race. Byron Harmon's successful expedition to photograph the Columbia Ice Field last summer and fall is the crowning achievement of 20 years spent in picturing the Canadian Rockies, but it does not mark the end of the work.

My first meeting with Harmon was in the summer of 1920, at a camp on the iceberg-battered shores of that incomparable mountain gem, the Lake of the Hanging Glacier.

It was there that I first heard of the Columbia Ice Field. Harmon had never seen it himself, but had been told enough of it by mountain climbers who had made ascents within sight of it, to lead him to believe that the region was probably the finest scenically in all the Rockies.

Because it was remote and difficult to reach, he was saving it for the summer of his 20th year of photographing in the Rockies. With a properly equipped expedition, he hoped to be able to cover all of the region along the Continental Divide where he had not worked hitherto with his cameras.

In the spring of 1924 Harmon wrote me that he had completed his preliminary plans for his Columbia Ice Field trip, and he asked me to join him and aid in making the motion-picture film.

A JOURNEY OF OVER 500 MILES FROM BANFF TO THE ICE FIELD AND BACK

With a jaunt of my own already planned—to drive a small motor boat from Chicago to New York by way of the Great Lakes and the St. Lawrence—some rearrangement of schedules was necessary to make both trips possible, but ultimately I was able to dock in New

York in time to swing back to Canada and arrive at Banff by August 15. A pack train was already assembled at a camp on the Bow River near Lake Louise.

The route laid out for our trip followed the Bow to the lake and glacier of the same name at the Continental Divide. Thence it paralleled the Divide, as closely as topography would permit, until the Columbia Ice Field was reached, at the head of Castleguard Valley.

After a month or more of work on or near the ice field, including a crossing of one spur with pack train and a circuit to the head of the Athabaska, under Mount Columbia, on its northern side, winter clothes and supplies would be picked up at Jasper and the return journey of 200 miles to Banff made by the best available route through the early snows.

Photograph by Byron Harmon

A BUCKING HORSE "BROADCASTING" THE RADIO

The cedar box containing the supposedly fragile outfit underwent this terrific bombardment from the hoofs of a temperamental pack animal, yet the set survived (see text, page 399).

It was expected that this itinerary would require 10 or 12 weeks, owing to enforced waits for favorable picture weather, and the fact that nothing worthy of the name of trail would be available for any considerable sections.

Two features of the proposed itinerary impressed me as verging closely upon the impossible: The plan to take the horses across the ice field and the expectation of marching for two or three weeks of the return journey through a region of high elevation, where not only the passes, but many of the valleys as well, would be deep in snow.

As to the ice-field traverse, I was told that such a crossing had been safely made the previous summer by the pack train of a mountain-climbing party. Therefore, there was no reason to believe it could not be done again, especially since one of our packers had been with the pioneer outfit.

As for the long snow journey, Harmon thought it worth while to face its rigors, since neither moving pictures nor stills had been made previously of such a passage over the high Rockies.

HARDSHIPS FORESEEN; SPECIAL EQUIPMENT SELECTED

As we expected to encounter high water and ice on the outward trip, and heavy snows during the return, we had every

Drawn by C. E. Riddiford

ROUTE OF THE COLUMBIA ICE FIELD PHOTOGRAPHIC EXPEDITION

From this ice field of 150 square miles, on the Continental Divide, waters flow north, east, and west into the Arctic, Atlantic, and Pacific oceans (see text, page 378).

reason to anticipate one of the severest journeys ever attempted with a pack train in the Canadian Rockies. Great care, therefore, was taken that the outfit, as to personnel, stock, and equipment, should be of the best.

With years of personal acquaintance among the guides and packers of the Rockies, Harmon engaged the three best suited to our special needs. They were all mountain men of long experience. One, La Casse, was well acquainted with the region to be traversed as far as the Columbia Ice Field and on to the Athabaska Glacier and Wilcox Pass.

The men were informed in advance of the plans and itinerary and warned that the picture work would inevitably be responsible for delays, difficulties, and discomforts not usually encountered on hunting and camping trips.

The horses, picked long in advance, had been kept off the trail all summer to conserve their strength for the arduous and punishing work ahead. This was most fortunate, for the long weeks of semistarvation in the snows of early winter, with endless hours of desperate floundering in deep drifts of the high passes, demanded all their stamina.

Besides a motion-picture camera, with its varied assortment of lenses and 8,000 feet of film, Harmon and I had each two still cameras, with an ample supply of roll and cut films.

The motion-picture film and my roll films were carried in sealed tins. Harmon's huge reserve of cut films, by some oversight, was sent in ordinary wrappings, thereby causing much anxiety during the days when we encountered mud and high water.

The only real weakness in the outfit was its lack of water-tight boxes and bags. The pack-boxes for the motion-picture camera and its accessories would afford adequate protection from hard knocks, but would not exclude water. Neither would the grub-boxes or the sackings for the food supplies.

As a consequence, when we were confronted unexpectedly by severe high water, we lost more supplies in two days than the recent U. S. Geological Survey expedition lost in its three months' voyage through the rapids of the Grand Canyon.* Even at that, however, we were never seriously handicapped by a shortage either of food or of photographic supplies.

RADIO, CARRIER PIGEONS, AND A TYPEWRITER THE ONLY LUXURIES

With luxuries cut to the bone, since no replenishment of supplies would be possible within six or eight weeks, our only real frills were a radio set, carrier pigeons, and a typewriter.

The little portable Radiola was my own idea, born of the memory of the entertainment which the Grand Canyon party had derived from a similar outfit a year previously.

The carrier pigeons were Harmon's idea. He had been breeding "homers" at Banff for a year or more, but had never had a chance to try them out in the mountains. The present opportunity was too good to be missed. Besides, there was always the chance that we would be glad of a way to send a message by air, in the event ordinary means of communication became impracticable.

* See "Surveying the Grand Canyon of the Colorado," by Lewis R. Freeman, in the National Geographic Magazine for May, 1924.

Drawn by C. E. Riddiford

A SKETCH MAP OF CANADA: SQUARE SHOWS THE AREA COVERED BY THE MAP ON THE OPPOSITE PAGE

The birds would also prove useful for reporting on radio conditions. Several powerful stations had promised to make special efforts to reach us, in the event the Rockies area did not prove entirely "dead," as there had been some reason to believe.

Neither Harmon nor I knew more about carrier-pigeon technique than we did about that of radio. All we could learn locally was from an old children's bird book, which stated that the door of the home cote should be of valvelike construction, permitting the ingress of the returning bird, but not the egress. The boxes in which the pigeons were carried, we read, should be provided with holes large enough to admit plenty of air, but not so big as to allow the birds to escape before their time. Both of these admonitions seemed reasonable.

Less convincing was the instruction that the message should be written on waterproof oiled paper and wrapped securely to one of the bird's tail feathers. As the only line I had on this point was a hazy memory of the picture on a childhood valentine of a dove with a very plump packet dangling from its neck, I was diffident about disputing the practicability of the tail-feather plan.

We purchased a stock of oiled paper on the theory that it might better resist the disintegration of possible fogs or

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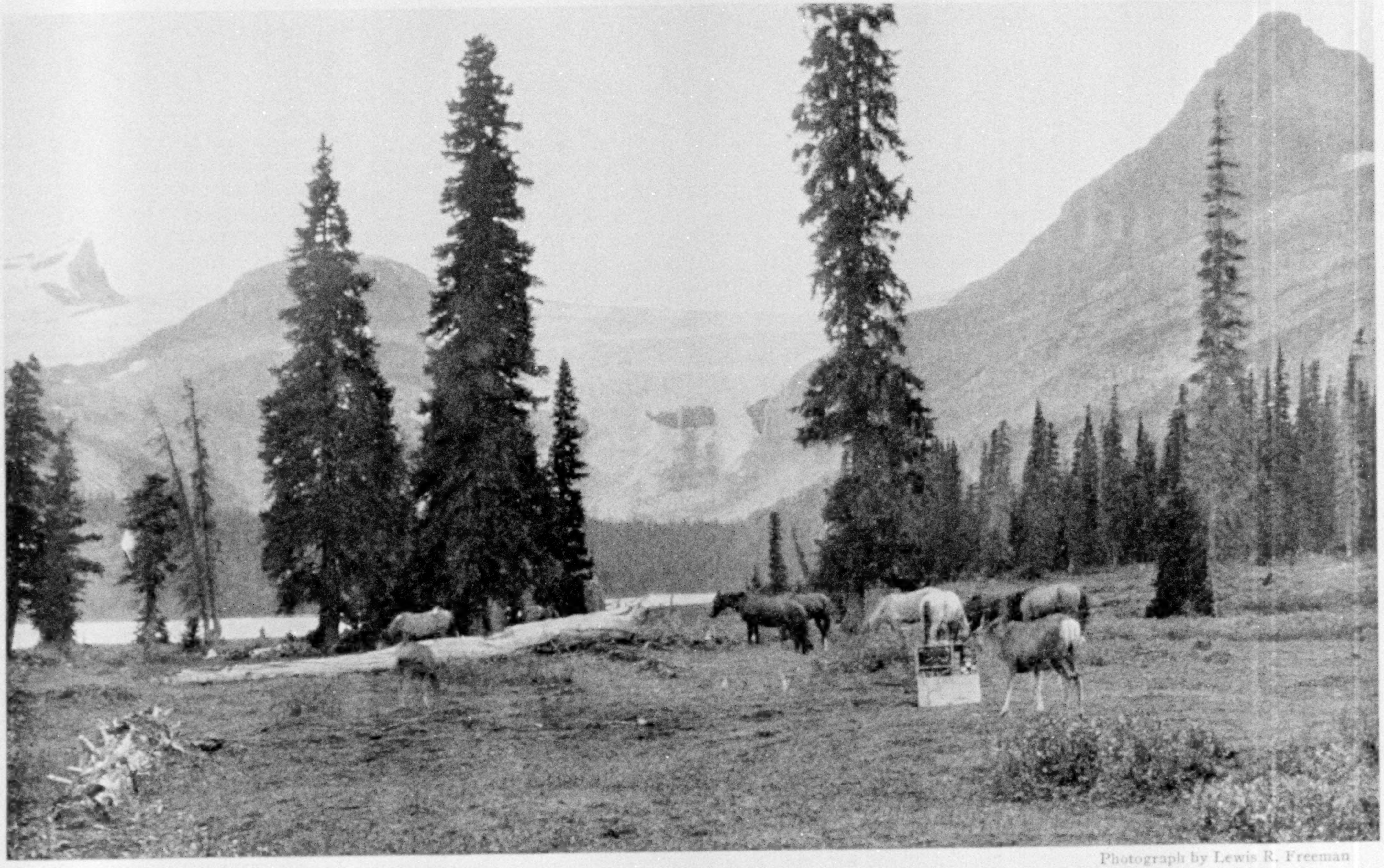

Photograph by Lewis R. Freeman

A WILD VISITOR INSPECTS THE EXPEDITION'S RADIO

A doe, following the horses into Bow Camp, took advantage of the occasion to satisfy her curiosity (see text, page 395).

Photograph by Byron Harmon

WATERFOWL LAKES, WITH PYRAMID PEAK BEYOND

The shores of these lovely twin lakes are so marshy that one could not dip a cup of drinking water from either without running the risk of being mired. The upper and lower lakes are joined by the gleaming ribbon of the Mistaya River (see text, page 402).

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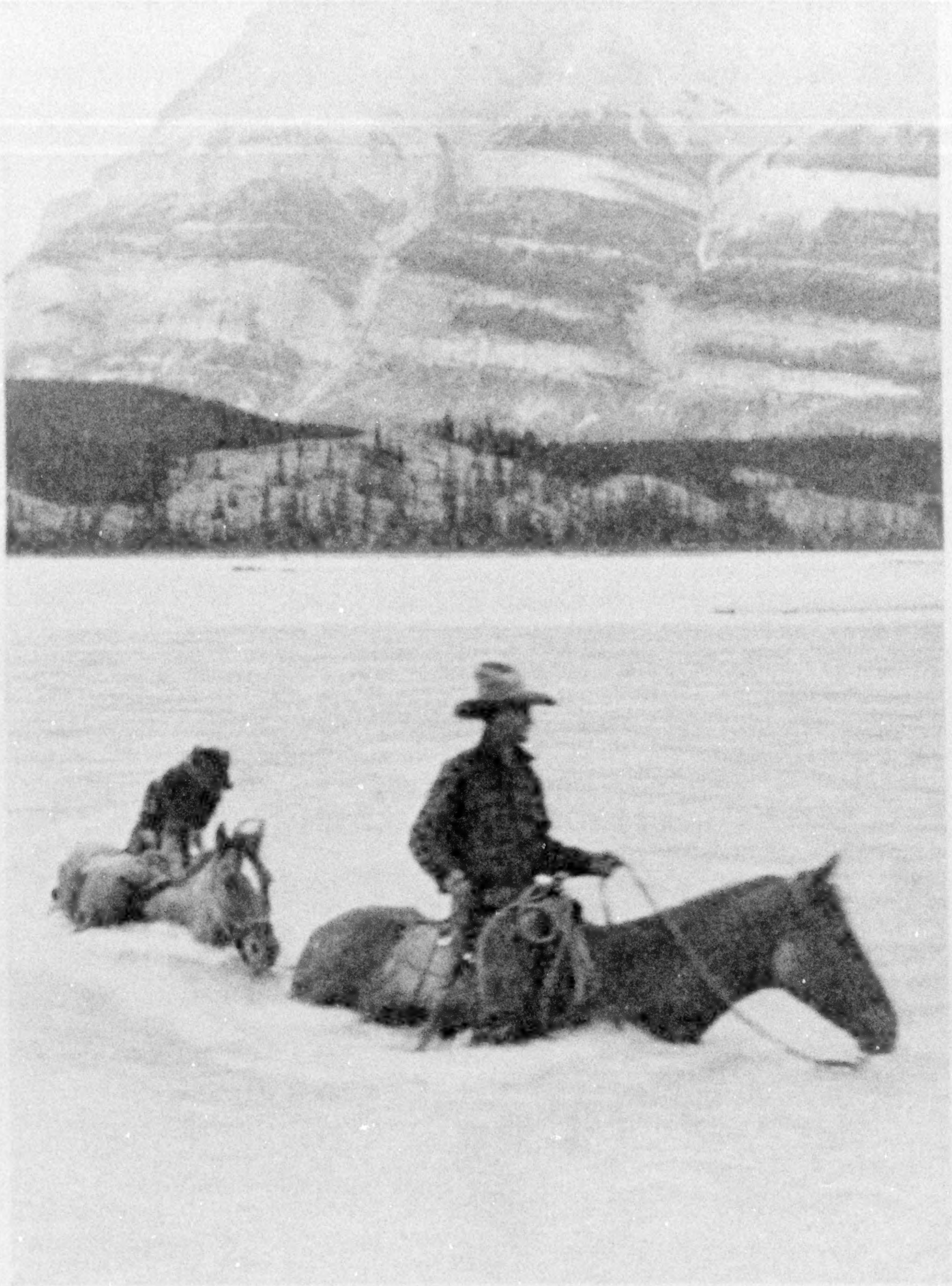


Photograph by Byron Harmon

BUSTER RIDING A SWIMMING PACK HORSE ACROSS THE FLOODED SASKATCHEWAN (SEE TEXT, PAGE 406)

rains, but fortunately we tried it out before starting, and learned that even the softest pencil point would skid along the polished surface without leaving the vestige of a mark.

That was why my little folding typewriter was requisitioned at the last moment to fill the breach. A sharply struck key left an impression on the tough, smooth paper which resisted blurring, even under the hard rubbing of a moist finger tip.

LETTING "NATURE TAKE ITS COURSE" ON THE EXPEDITION'S BAGGAGE

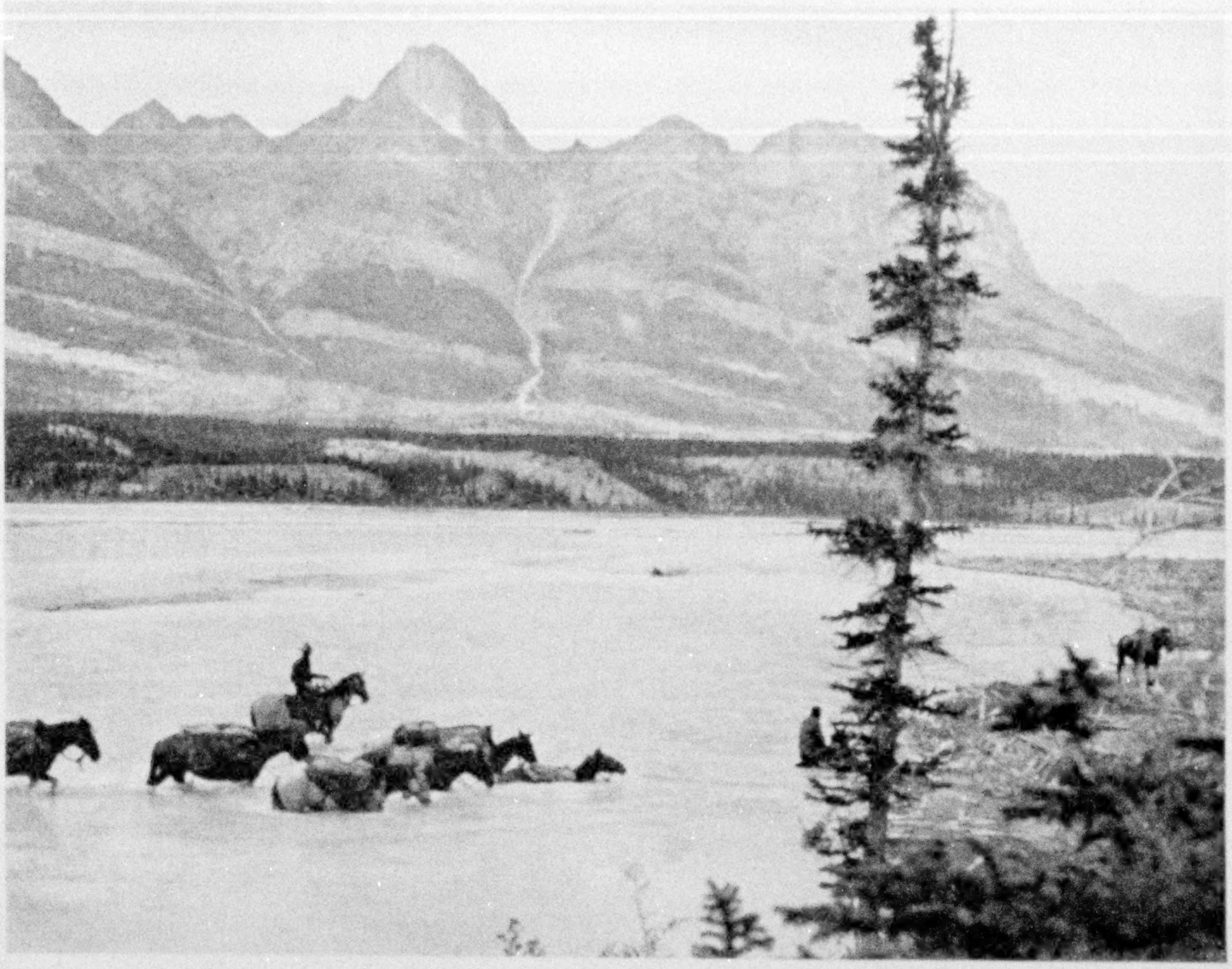
The unexpected addition of radio and carrier pigeons, with their accessories, together with two extra cases of photographic supplies, swelled the baggage to a volume that demanded the increase of our 16-horse pack train by two or three head. With no animals of the sturdy breed necessary for the rough work available at Lake Louise, "Soapy" Smith, head packer and owner of the stock, philosophically decided to divide the extra load among the horses he had, adding that we could "let Nature take its course" in reducing the loads to proper proportions.

I innocently supposed this cryptic remark referred to inroads our appetites would make upon the grub supply, but, as the sequel proved, our trail-wise mountaineer was thinking of what happens to overly bulky packs in traversing a land of muskeg (marsh) and fallen timber.

We encountered close-growing timber as soon as we turned north from the railway line, and the first nine miles up the swampy flats of Bow River were a fitting initiation for the stern work coming.

One of the first packs to be knocked under a horse's heels, by colliding with the limb of a half-fallen tree, originally consisted of cases of jam and baking powder, with the insulated wire for the radio aërial riding between. Only the tangled antennæ materials preserved their identity so as to be recognizable after the terrible mauling under new-shod hoofs.

The preserve-smeared and powder-dusted loops were, nevertheless, still in a condition to lend point to old Soapy's atrocious attempt at a joke.



Photograph by Byron Harmon

THE PACK TRAIN ENTERING AN UNEXPECTEDLY DEEP CHANNEL OF THE SASKATCHEWAN

Both packs and men received an icy drenching when the horses were rolled under the caving cut bank on the right. This photograph shows the author leaving his saddle to give a floundering horse a chance (see text, pages 406-407).

"If that geesly radio don't 'jam' again when she's set up," he drawled, "this anointing ought to qualify her for broadcasting some right snappy baking receeps!"

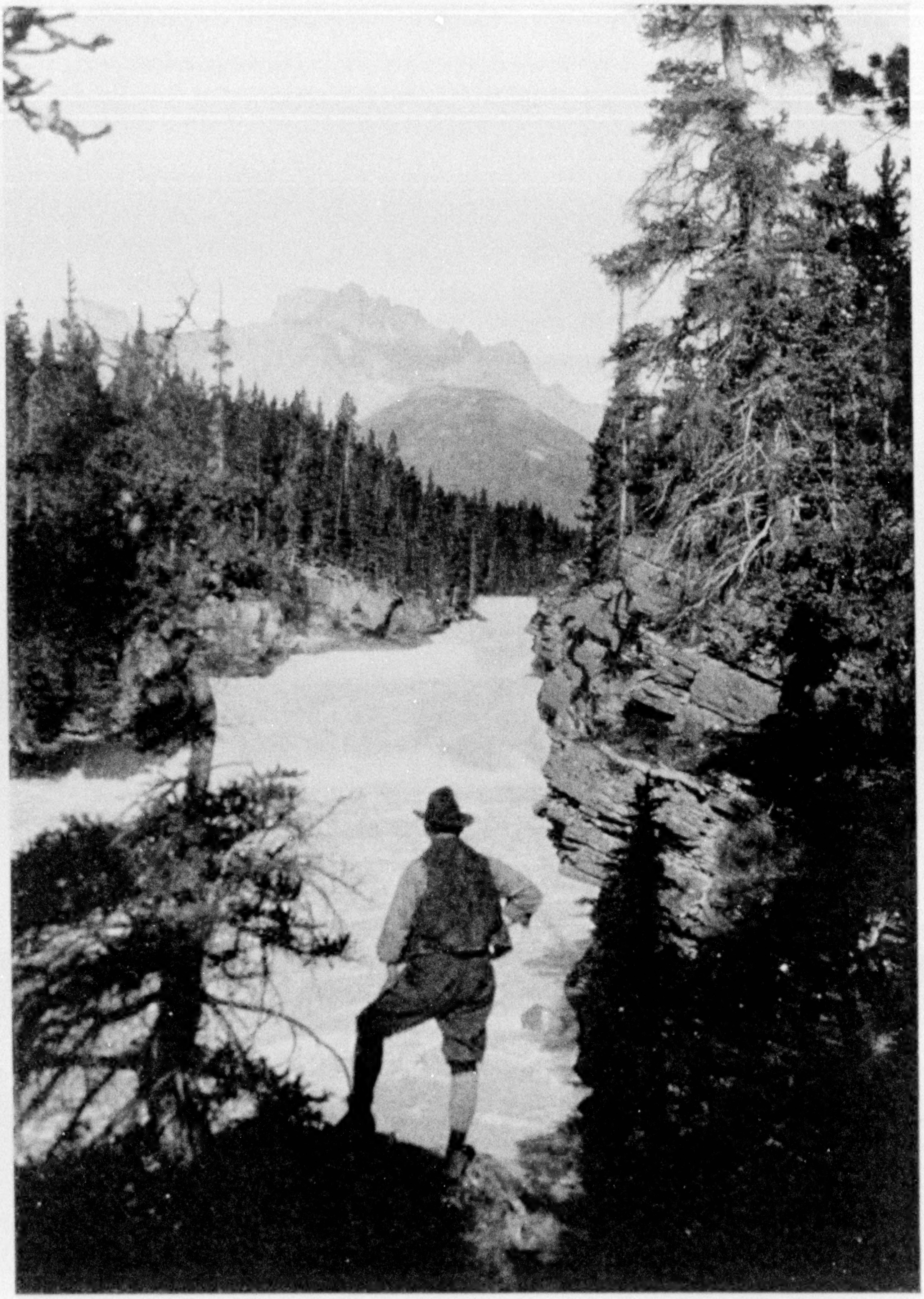
THROUGH BOGS AND FALLEN TIMBER

Between mud and devious windings among deadfalls, our progress that first day was painfully slow. Now a horse was bogged to its belly; now a pack jammed tight between two close-growing trees, while its bearer struggled on through; now, with all signs of a trail gone, the whole train would scatter through the timber. We were six hours making nine miles.

Everyone was so busy finding strayed horses and scattered packs that the ever-heightening western wall of the Rockies, with its shimmering fingers of glacial ice clawing for precarious holds above the valley of the Bow, unfolded its brilliant panorama almost unnoticed.

Making camp in drizzling rain, we took stock of the first day's attrition. With stoutly boxed and sacked stuff, salvage had been almost complete. The losses were chiefly in our stocks of baking powder and dehydrated vegetables, especially where the packs had gone to pieces in mud or water. Wet baking powder was, of course, gone forever, but in the case of dampened dried fruit and vegetables, the result had been to increase volume far out of proportion to the actual loss.

Nature had taken its course, but, far from acting in the way Soapy anticipated, our packs had increased in volume, if not weight, by 5 or 10 per cent. This meant that the packs would be larger than ever for a few more days. But Soapy's hour was to come.



Photograph by Lewis R. Freeman

WHITE WATER IN BOX CANYON OF THE NORTH FORK OF THE SASKATCHEWAN

Here the water rose from 20 to 25 feet in three days; cascades were wiped out by a solid white stretch of tumbling torrent (see text, page 408).

Photograph by Byron Harmon

FLOUNDERING HORSES AND SWIMMING DOGS IN THE ALEXANDRA RIVER

Several animals were carried downstream 100 feet or more, but luckily found sloping bars upon which to clamber to safety (see text, page 427).

Finding it no longer possible to continue up the half-flooded flats of the Bow, the following morning the horses were dragged and shoved for 500 feet up the steep eastern wall of the valley to where a narrow trail had been blazed many years before. It was a desperately hard scramble for loaded animals, and far from soft work for men.

MOVING BOULDERS AND AVOIDING AVALANCHES

Every few feet hair-poised boulders, left by the slide whose wake we followed, had to be rolled aside to give footing to the scrambling horses. To turn a rock over and prop it up to prevent its rolling down a 50-degree slope on to a pack train strung out below are operations that require both care and judgment, to say nothing of strength.

By keeping very much in open order and out of a direct line below the point where active road work was in progress, we managed to avoid pieces of rock which went adrift and headed little avalanches to the valley.

We had too much of the same sort of mountain-side work in loose rock with the pack train before the trip was over, and, speaking personally, I was never able to stir up any enthusiasm for it. With each of the four floundering feet of 16 horses (not to mention those of five men and two dogs) a potential starter of a moving mountain side, the feeling engendered is far from the one of comfortable placidity that comes with the reassuring clasp of a rope on the rim of a 100-foot crevasse.

The trail which we labored so hard to gain proved to be the almost obliterated remains of what had been only a wretched track at best. It was blocked here and there by fallen timber, which had to be cut away whenever presenting too high a barrier for the horses.

Congratulating ourselves on the fact that the well-drained mountain side would at least give better footing than the bottomless muskeg, we started worrying the train along through the prostrate tree trunks as best we could. We had made about a mile when an innocuous-looking

Photograph by Byron Harmon

FORDING THE ALEXANDRA ON FOOT TO RECOVER PACK HORSES

The current was too strong for one man alone, so a human chain was formed.

patch of moisture, where a limpid springlet dribbled out, proved that these anticipations were premature.

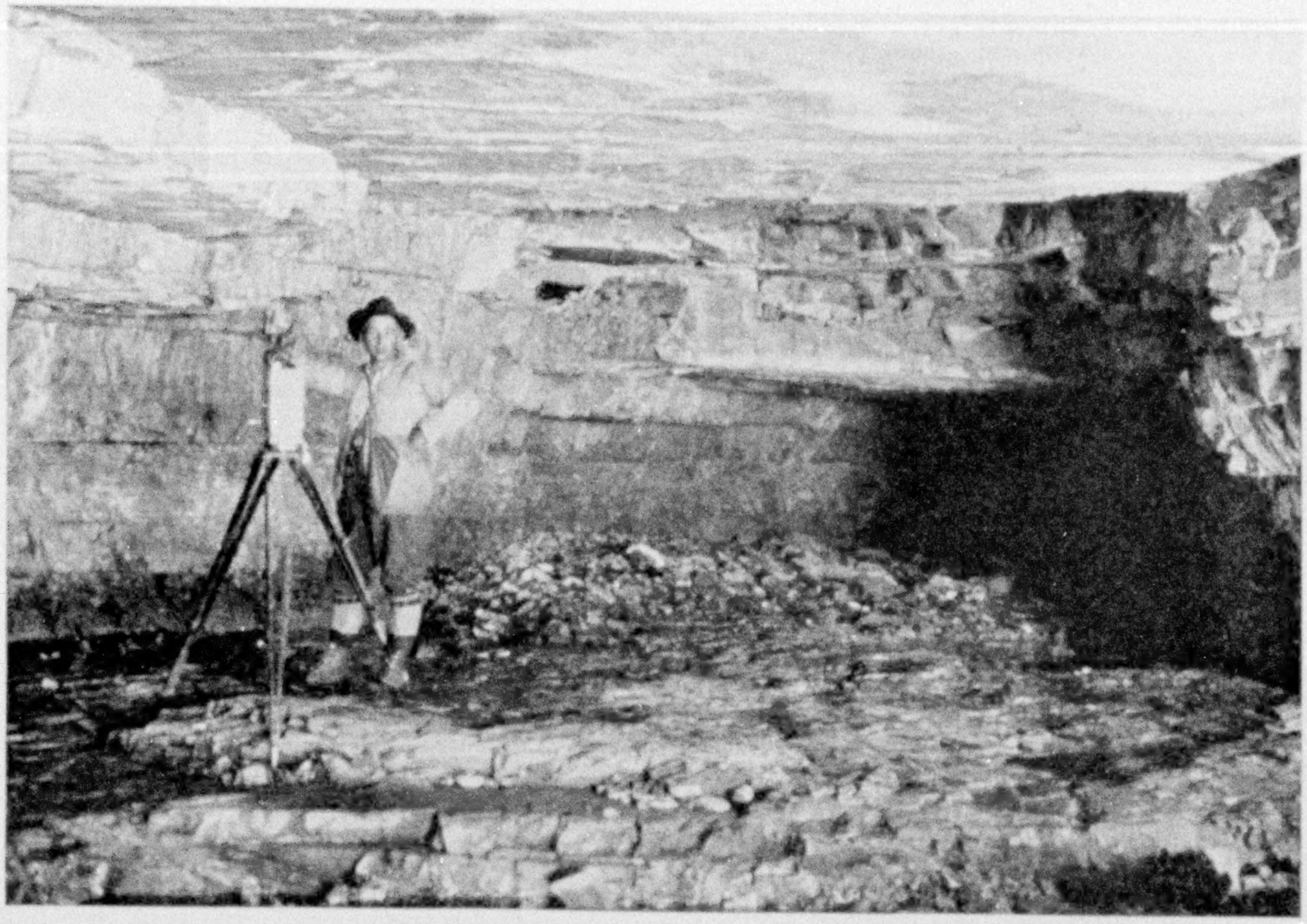
La Casse, on foot, was in advance of the train, leading a wiry little buckskin called "the Rat." Because of his surefootedness, the Rat had been given the highly responsible task of carrying the pigeon box, a frail packing case of corrugated pasteboard, lashed to ride high up on top of a bulky pack of bed rolls.

THE PIGEONS AND A HORSE ARE RESCUED FROM A BOG

We figured the box was worth the trouble it was giving us in maneuvering clear of overhanging limbs to have it as high as possible in case the Rat had to swim at a ford or became deeply bogged.

Now this was soundly reasoned, but held good only so long as the Rat remained right side up. When that shifty ex-Indian cayuse found the trail under him suddenly resolving into a bottomless patch of soft mud, he tried to get out of it by rolling. Nothing less than the quick-witted cook's catlike leap and flying tackle saved the flimsy pigeon box and contents from being rolled as flat as a pancake.

The birds were freed with hardly more than an upsetting of their water-can, but the case of their late bearer was serious. He wallowed until his head was folded



Photograph by Lewis R. Freeman

A FLASHLIGHT OF A CAVE IN THE CANADIAN ROCKIES

From this recess issues, at times, a large part of the flow of Castleguard River. Byron Harmon is seen with his motion-picture camera.

back under his body; then, with all four legs sticking straight up in the air, he surrendered to fate and began resignedly to strangle.

Rob, the wrangler, had already thrown a hitch over the forelegs and was pulling down the trail, when Soapy, dashing into the scene from above, lassoed the hind legs and set his mount pulling in the opposite direction. It was decidedly rough on the Rat, but in the end it proved his salvation.

Drawing himself together before he was completely pulled apart, he kicked free from Soapy's hitch, turned a complete somersault, landed on his feet, and bounded along in the slithering wake of Rob.

The Rat was a tough little brute. An ordinary horse could hardly have been less than drawn and quartered by so terrific an experience, but he showed almost no ill effects for a while. Later, it became evident that there must have been some injury to his back, for he was never able thereafter to raise his rear hoofs more than a foot from the ground when trying to kick. Yet even this trouble never affected his usefulness as a sturdy pack horse.

Tall, slender, extremely dense timber screened all but occasional glimpses of a gray-green sheet of water widening across the valley floor below. This was Hector Lake, named for the physician and explorer with the Palliser Expedition, which made the first scientific exploration of the passes of the Canadian Rockies in 1858.

This lake is fed by a stream from the Hector Glacier, which extends from the summit of the Waputik Mountains, as the main chain of the Rockies is called in this region, and drains to the Bow, which, at high water, covers the low, level valley flats to the south and east with a lake of its own.

Passing out of the heavy timber, a half mile among the chaos of piled rocks and upended tree trunks, where snowslides of many centuries have left their accumulated scourings at the foot of the mountains, we crossed the boulder-choked

Photograph by Lewis R. Freeman

ON THE CLIMB TO MOUNT CASTLEGUARD

Laden with cameras, the trio is seen avoiding a crevasse on the dangerous ascent (see text, page 433).

dust, with which I have ever had personal contact. Like the mills of God, those of the glaciers, though they grind but slowly, "yet they grind exceeding small."

The dust is so impalpable that it will filter through the closest-woven canvas; the mud, at its worst, offers no resistance whatever to the downward passage of the foot or body of horse or man. Once into it, one goes straight on to bedrock, unless he has help or is so fortunate as to encounter some extraneous body, like the trunk of a tree.

Our packers claimed that glacial silt had one use. It was a wonderful abrasive—had no equal, in fact, when used as a paste on razor strops. Not having shaved during the trip, I had no chance to test this single virtue of the pestilential stuff. As to its abrasive effect on tempers, however, I can testify from a full heart.

channel of Mosquito Creek. Then we descended again to the flats of the Bow.

In spite of several fordings of the deep, swift river, the going here was the best since leaving Lake Louise, due principally to the fact that, with the valley floor sloping at a sharper declivity, more water had been drained out of the clinging, blue-gray glacial silt with which it was paved.

THE SCOURGE OF GLACIAL SILT

First and last, glacial silt was the most annoying obstacle we encountered on the whole journey. The main by-product of the grinding mills of the ice makes the muddiest mud, as well as the dustiest

We followed the winding ribbon of the Bow until mountain meadows, gay with flowers, gave place to the narrow and precipitous canyon which drains the lake above. Then we were forced to ascend to a series of sloping benches to the north for another miserable stage in bogs and fallen timber.

Climbing slowly but steadily, we skirted the attenuated finger of the lower lake, passed the swift-flowing narrows above, and came out at the end of the afternoon upon the firm, pebble-paved beach looping in the easterly arm of the upper, or main, Bow Lake.

The scene which burst upon us, after the wearisome struggle with an all but

exhausted pack train in the black inferno of burned timber and mudholes below, was of an unearthly loveliness.

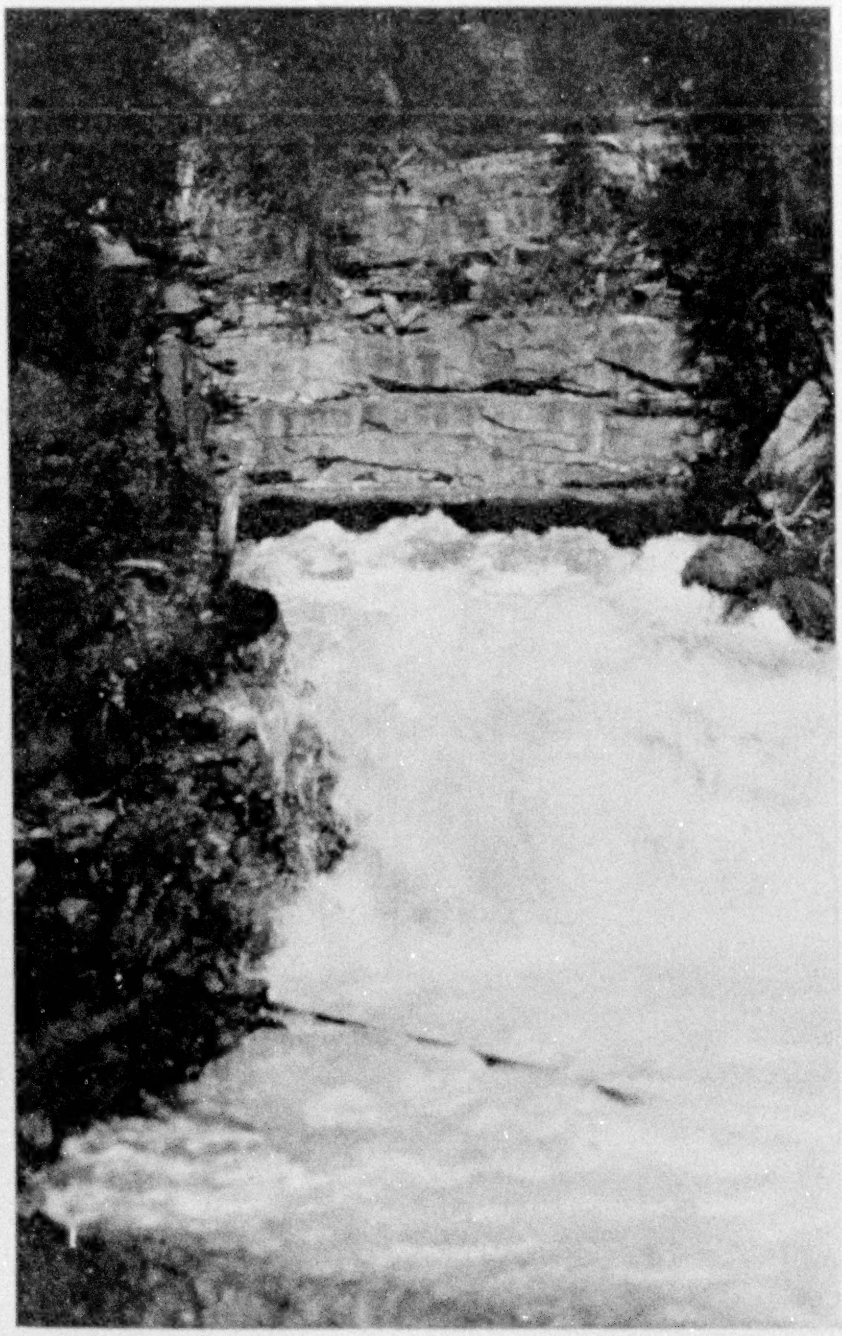
THE SCENIC BEAUTY OF UPPER BOW LAKE

To our left was the weird Crowsfoot Glacier, clutching with icy talons the precipitous slopes of towering Bow Peak to keep from falling into the foam-white rapids of the narrows below. To our right, a long, gently sloping wedge of meadow, dark green and brown and mottled with shadows of low-lying bushes and clumps of snow-stunted pines, led up to the broad notch of Bow Pass.

Through this defile could be seen pinnacles of the snowy peaks across the Saskatchewan, floating, sun-sharpened, against the blue haze.

Ahead, across a milky-jade lake surface gently ruffled by the evening breeze, was a wall of ice and rock culminating in the solid mass of Bow Glacier, which reared its bottle-green snout above a gray boulder-fan streaked with glittering runlets of tumbling water.

Two great waterfalls, flanking the face of the glacier to left and right, showed perpendicular shafts of gleaming white, round and solid, like the marble pillars supporting the arch of a Grecian temple.



Photograph by Lewis R. Freeman

A WATERFALL GUSHES FROM THE MOUNTAIN SIDE TO PLUNGE INTO THE ALEXANDRA VALLEY

The stream from this fine cataract seemed to furnish more than half the flow of the entire Alexandra River (see text, page 428, and illustrations, pages 389 and 390).

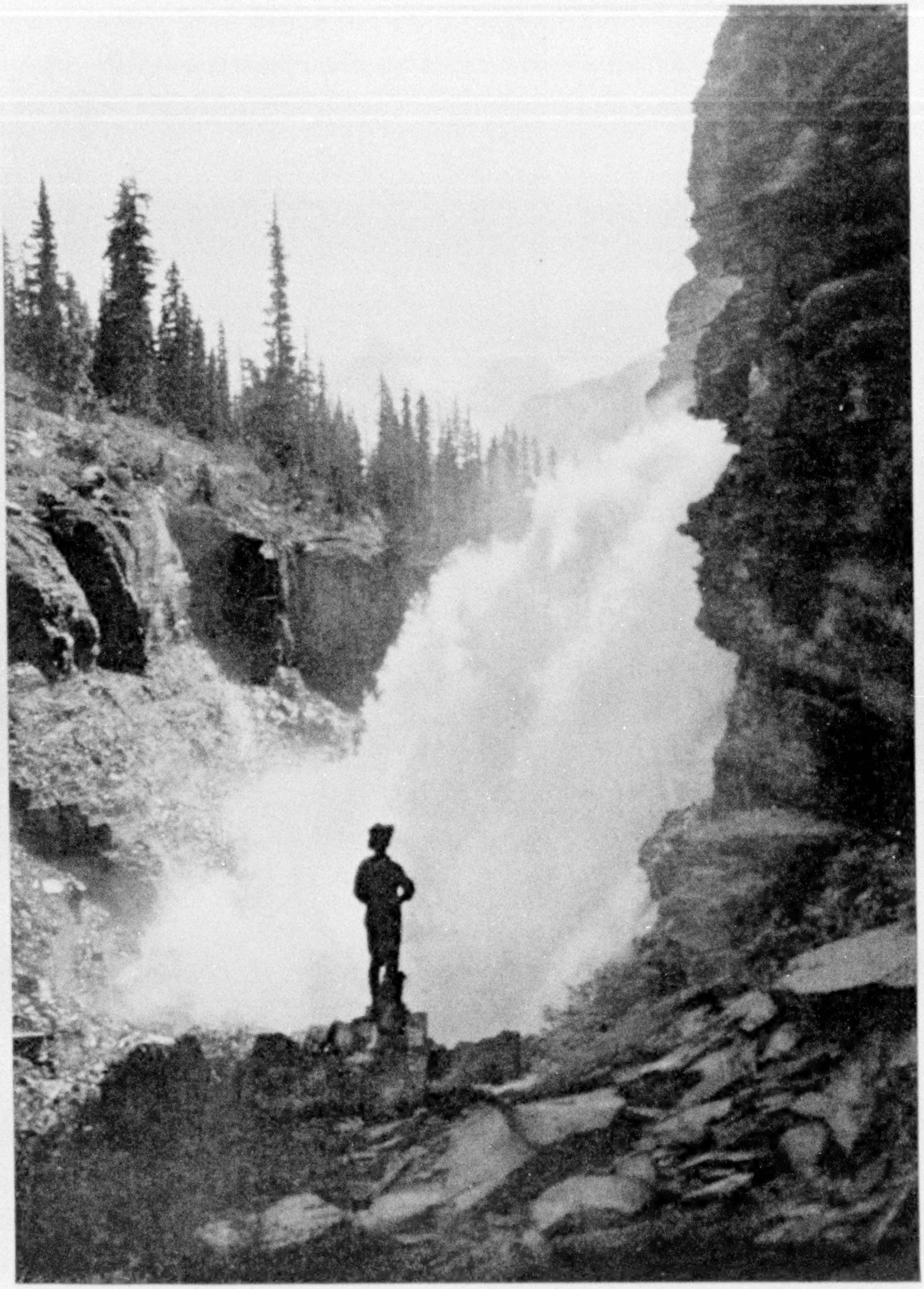
The slanting afternoon sunlight formed concentric circles of rainbows in the mist-whorls rising from the foot of the twin cataracts, before striking through to prick with opalescent gleams the dancing wavelets of the lake below.

A camp site in the northern Rockies demands not only a fairly level and comparatively dry place for the tents, but also good grazing for the horses within reasonable distance. With none of these essentials available where we were, we had to push on until they were found.

The fact that we had already been eight hours on the road, where four or five of such travel was all a pack train should be required to endure, had nothing to do with the situation.

THE MUD WINS THE FIGHT

The mountain side sloping to the east end of the lake proved to be honeycombed with bubbling springs, clear and beautiful, but potential morasses for the weary horses. At the end of a quarter of a mile, with half of the animals down and all of them near the end of their strength, we gave up the fight with the mud and dragged them, one at a time, down to the lake.



Photograph by Byron Harmon

CASTLEGUARD FALLS WITH MOUNT LYELL IN THE DISTANCE

"A 20-foot cascade on the river above the camp and a 100-foot sheer fall just below were the crowning touches in a picture etched deep on the tablets of memory" (see text, page 429).

THE AUTHOR (LEFT) AND HARMON (RIGHT) GETTING THE STOCK REPORT BY RADIO

Station KGO, Oakland, California, afforded this service to the ice-marooned explorers. A complete opera rehearsal in San Francisco was also heard through the Oakland station.

There was no beach for the next mile, but, with the bottom solid and the water not over 10 to 20 inches deep, it was possible to make slow but steady progress.

Splashing and floundering over slippery rocks, we skirted the leaking mountain side, only to find the ground becoming soft and soggy where the little valley ran back to the summit of Bow Pass. What had looked like a pretty meadow a mile away turned out to be brushy muskeg, with a narrow, steep-banked stream winding back and forth across it like the wake of a wounded snake.

With several horses ready to quit every time they bogged down, we were nearly an hour wallowing across the last half mile. Then we pushed through a forest of fine old spruce to a protected and beautiful camp site a few hundred yards back from the north side of the lake, with Bow Glacier, rosy-pink in the sunset glow, reared against the sky line.

Rain in the night, turning to snow after dawn, was followed by a day too overcast to make picture-taking practicable. Snow on August 20 was a significant reminder of how near winter stalks in the northern Rockies, even in midsummer.

THE RADIO INTERESTS WHITE-TAILED DOES

We erected the radio in the afternoon, with the aërial between two lofty pines, and were rewarded by vigorous wails from the ether, which gave promise of better things when we should have time to make a careful set-up.

However, we learned enough to reassure us on two important points: This section of the Rockies is not in any sense a "dead" area, and the terrific banging the radio outfit received had not seriously impaired its usefulness.

Our most interesting radio reception of the day, however, had nothing to do with the ethereal messages. During the forenoon salt had been thrown for the horses on the patch of grass where the radio was set up later in the day. Two or three times in the course of the afternoon several horses straggled down from the meadow above for another grateful lick of salinity. The last time they were

Photograph by Byron Harmon

A CAMP-MADE LOUD SPEAKER IN THE CANADIAN WILDS

A baking-powder tin and a coffee can whined forth the early evening news.

accompanied by two splendid white-tailed does, the first deer we had seen.

Taking our cameras and backing off unobtrusively into the timber, Harmon and I left the salt lick, and incidentally the radio, to our graceful lady visitors. The strange-looking and smelling box made a greater appeal to the curiosity of the pretty pair than did the salt to their palates. They stepped around and around the wonder in narrowing circles.

By the time we had slipped and slid along into a position suitable for pictures, one of them had satisfied her curiosity and gone back to munching the salty grass.

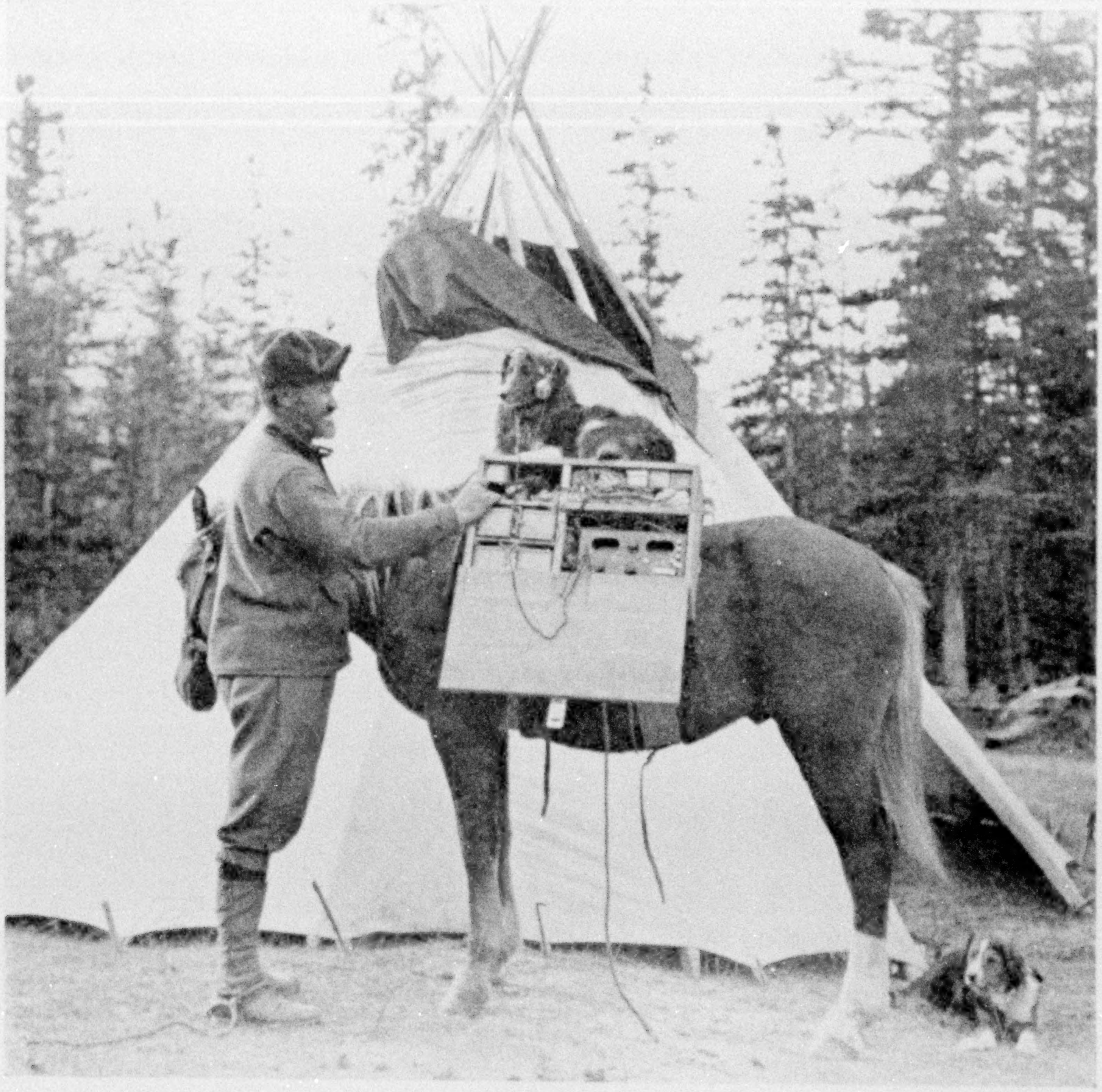
The other, when I snapped at 100 feet, was standing with extended neck, her sensitive nose sniffing not many inches away from the dials (see illustration, page 384). Stalking still closer, I was about to snap again when a snort, ripped out at the edge of the timber, sent both our afternoon-salt guests bounding away. Their lord and master had ordered his ladies home.

Another night with snow flurries gave way to a day of ideal mountain photographic weather—sunshine and squalls. With our full battery of cameras in action, we photographed the lake and its ice-crowned sentinels, mood by mood, from daylight to sunset.

There was an hour of repose in early morning, when every glacier and rock and pine-clad point was reflected, to the last detail, in the glassy, unrippling surface. Then there was a spell of smiling under the golden glow of the light-suffused eastern clouds, followed by a madcap dance of mirth and laughter, with the direct sunlight turning the breeze-stirred waves to shoals of diamonds and emeralds.

Laughter gave way to frowning, when shoal on shoal of murky thunderclouds poured over the Continental Divide and quenched the golden sunshine under a swiftly flung pall of sudden night; and when another wild blade of a free-lancing squall came bounding up the valley of the Bow and attacked the first in the middle of the lake, bluster and frown gave way to real tantrums.

No star of the movies ever registered more moods and expressions between



Photograph by Byron Harmon

GIVING BUSTER A DOSE OF RADIO-CAST JAZZ

daylight and dark than this lovely Lady of Bow Lake. By dint of much cranking and focusing, we transferred them to celluloid.

THE WAYS OF A WIND WITH A MOUNTAIN LAKE

A flareback of the tantrum mood caught Harmon and me and the cameras in mid-lake in a diminutive homemade boat, while I was trying to pull across to get a close-up of the Crowsfoot Glacier. There were a few hectic moments when we were vividly reminded of that classic description:

"De win' she blow from nor', eas', wes'.
De sout' win' she blow too."

With the lake trying to stand on end, and a flimsy craft that changed shape every time I laid hard on to the oars, there wasn't much to do but try to keep the so-called bow toward the highest wave of the mad moment. That, and Harmon's lively baling, sufficed by a margin not quite comfortable.

Nor were our apprehensions entirely on the score of the negative buoyancy of the movie camera. It takes a very warm-blooded man not to chill in swimming more than 100 yards in glacier water, and we were a good half mile offshore.

We had no trouble reaching land, once the center of the squall went about its business.

The lesson in the ways of a wind with a mountain lake came in good time. It

Photograph by Lewis R. Freeman

A PACK LASH-ROPE SUPPORTING THE RADIO AËRIAL WIRE FROM TEPEE POLE TO PINE TREE

prevented us from trying the same kind of argosy on other waters that were broader and deeper and just as cold as that temperamental patch of drippings from Bow Glacier.

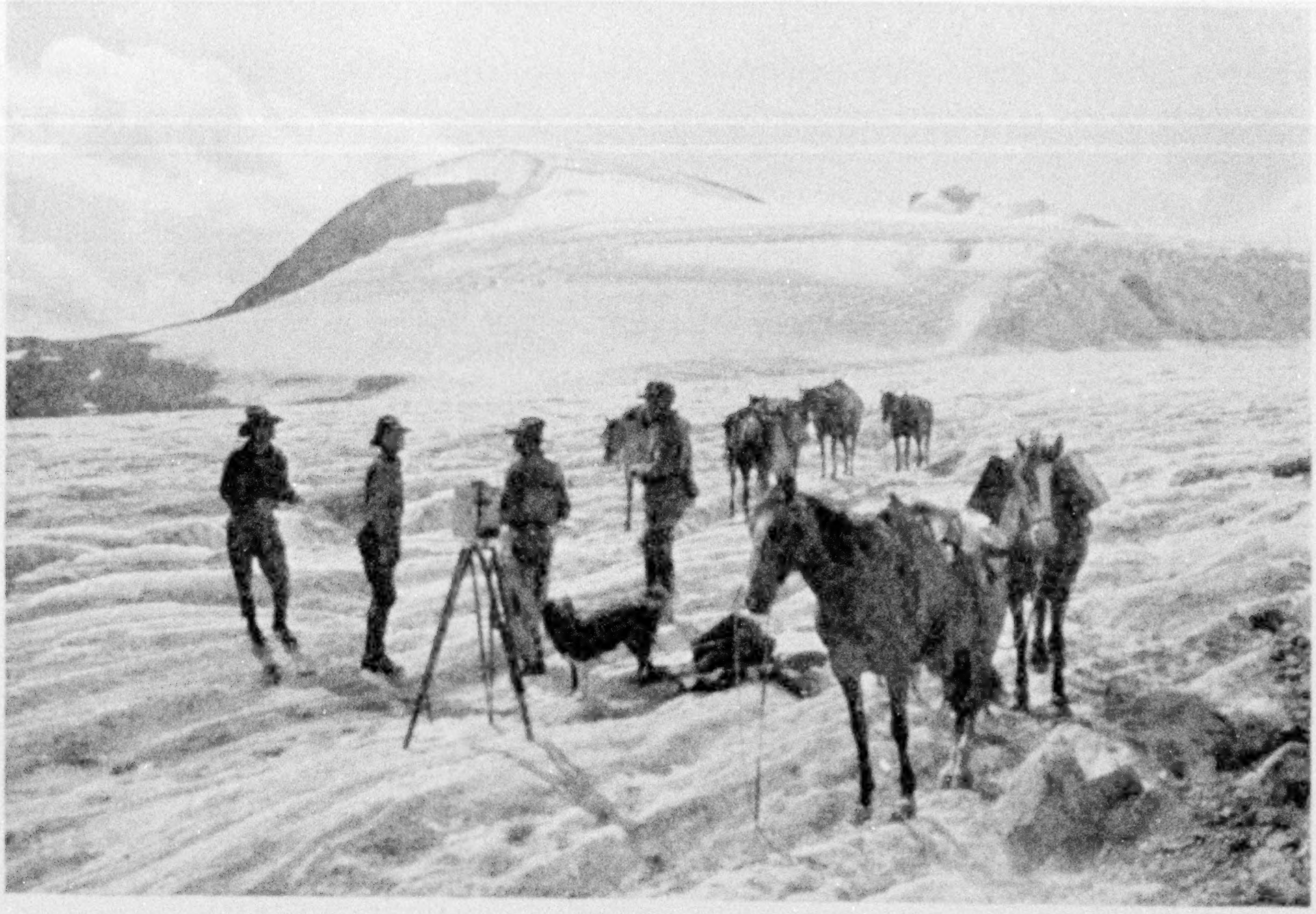
THE FIRST PIGEONS ARE LAUNCHED

As the sky cleared toward the end of the afternoon, we prepared to release our first pigeons. The messages, giving names of the radio stations already picked up and additions to lists of supplies to be sent us some weeks later at Jasper, were typed on the oiled paper.

After pulling loose several tail feathers in an endeavor to attach the tightly folded slips as directed by experts, we finally slipped them inside the leg-rings worn by each bird to carry its registered number. Tied with silk threads, the tiny rolls appeared to ride securely.

Two birds — a pair — were released simultaneously. Teaming up at once, they rose in widening circles for perhaps 1,000 feet, and then made off, apparently with great confidence, on a line a bit easterly to the general direction of the valley of the Bow. As this was almost the exact compass bearing of Banff, we felt certain they would soon be pecking at the door of their home cote.

Just why they failed to fulfill our hopes we never learned. The chances are that, failing to find—or possibly failing to effect entrance after finding—their former home, they went in search of another.



Photograph by Byron Harmon

JUST AFTER COMING ON TO SASKATCHEWAN GLACIER

"The horses, although in fine fettle after five days' feasting among the juicy mountain-meadow grasses, took the work seriously and showed little desire to bolt or hang back. Plainly, the strangeness of their surroundings and unstable footing had a sobering effect" (see text, page 437).

Whoever found the pigeons apparently kept them.

THE RADIO BOX GETS A TERRIFIC MAULING

Three days' rest with prime grazing had made a great difference in the horses by the time we broke camp again on the 21st. Though travel conditions continued no less arduous than before, much steadier progress was made. Bow Pass, a little below timber line, was reached and crossed by an easy grade. The descent to the valley of the Mistaya—rough, abrupt, and slippery—was effected with the knocking off of only two or three packs.

One of these included the radio, however. The cedar box containing this delicate and supposedly fragile outfit came in for a terrific mauling under the hoofs of a panicky pack horse (see page 381).

Abandoning hope of ever reassembling a wreck which, like Humpty Dumpty, might well have defied the best technical efforts of "all the king's horses and all the king's men," we simply roped up the shattered case and took the contents along as a movie "prop."

A herd of a dozen deer, offering easy targets as they watched us file over the summit of the divide, were not molested, for we were still too heavily packed to carry meat, and we were about to enter a region in which at almost any point an hour's climb with a rifle would result in a goat or sheep. We had neither time nor inclination to shoot for trophies.

Park boundaries, touched and crossed at several points, interfered at first with shooting for meat whenever a shortage occurred. As soon as pack room was available, however, it was easy to lay in a sufficient supply in the open sections to carry us through those in which shooting was not legal. Meat keeps a long time in these high, cold altitudes.

The Mistaya was a roaring, boulder-strewn torrent where we first came down to it, but at the end of a mile it broadened out into meandering channels emptying into the head of Upper Waterfowl Lake.

Photograph by Byron Harmon

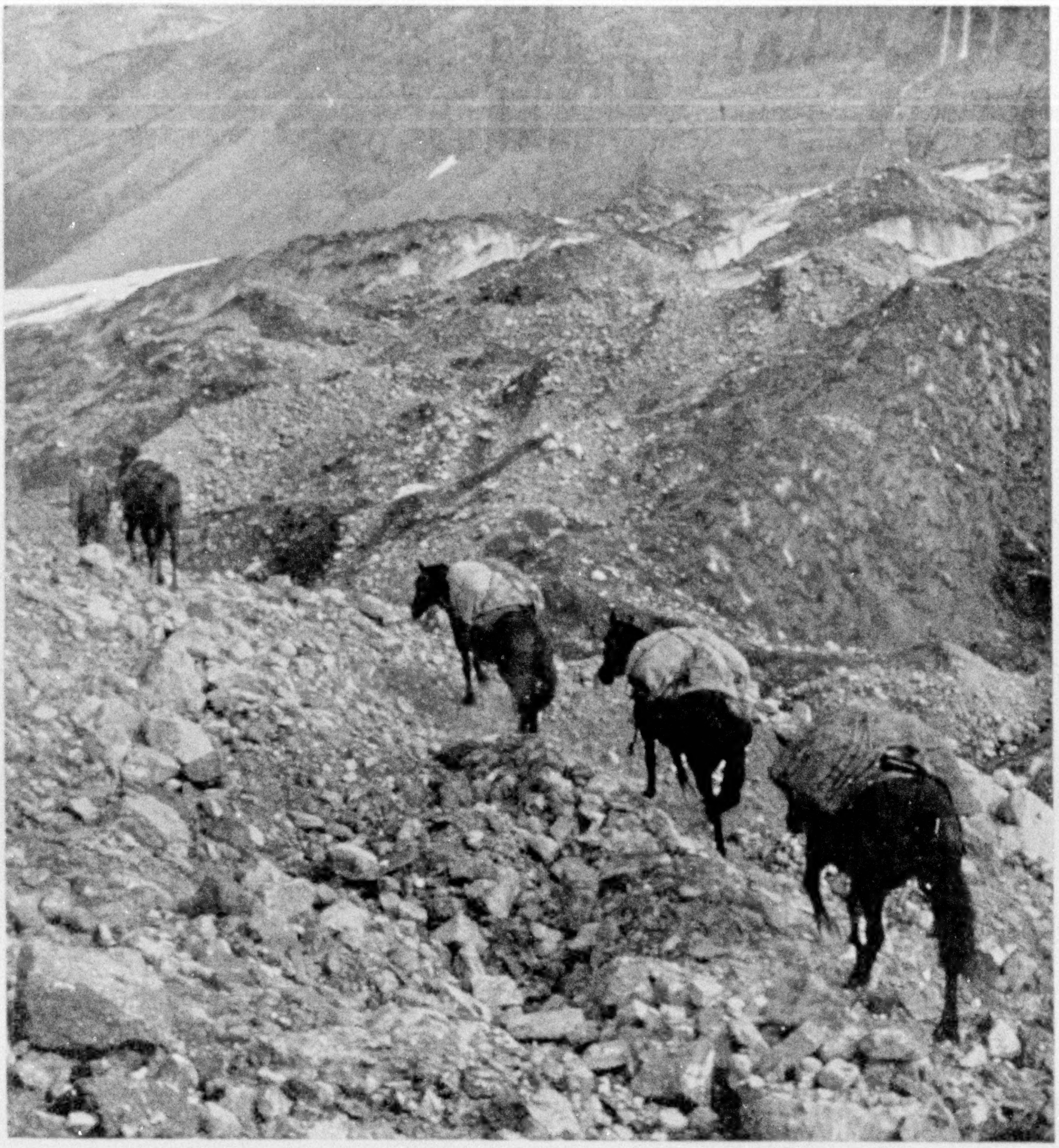
PASSING SIDE GLACIERS WHILE TRAVERSING THE LENGTH OF SASKATCHEWAN GLACIER

Before going out upon the ice, the horses had been tied head to tail in groups of three or four, each group being led by a man on foot.

Photograph by Byron Harmon

THE SNOUT OF SASKATCHEWAN GLACIER, SHOWING THE TERMINAL MORAINE

The party left the surface of the glacier some distance above the snout, as the number of crevasses made the going increasingly dangerous.



Photograph by Byron Harmon

A PORTION OF THE PACK TRAIN TRAVERSING BROKEN ROCKS, AFTER COMING OFF SASKATCHEWAN GLACIER

Several horses were injured here, and the loss of two was narrowly averted (see text, page 439).

Several deep fordings and a long, wet wade through boggy marshes took us to a precarious camping ground among the burned timber on the sloping mountain side east of the head of the lake.

The shore, beautiful to the eye, especially from a high altitude, was too boggy to permit even the dipping of drinking water without risk of being mired.

We remained here for a day in order to climb a few thousand feet to the summit of the easterly ridge for a vantage from which to take pictures of the splendid panorama of Howse Peak and Pyramid, with the silvered slivers of the Upper and Lower Waterfowl lakes, harnessed in tandem by the gleaming ribbons of the Mistaya's channels, prancing in the sunlit foreground (see page 385).

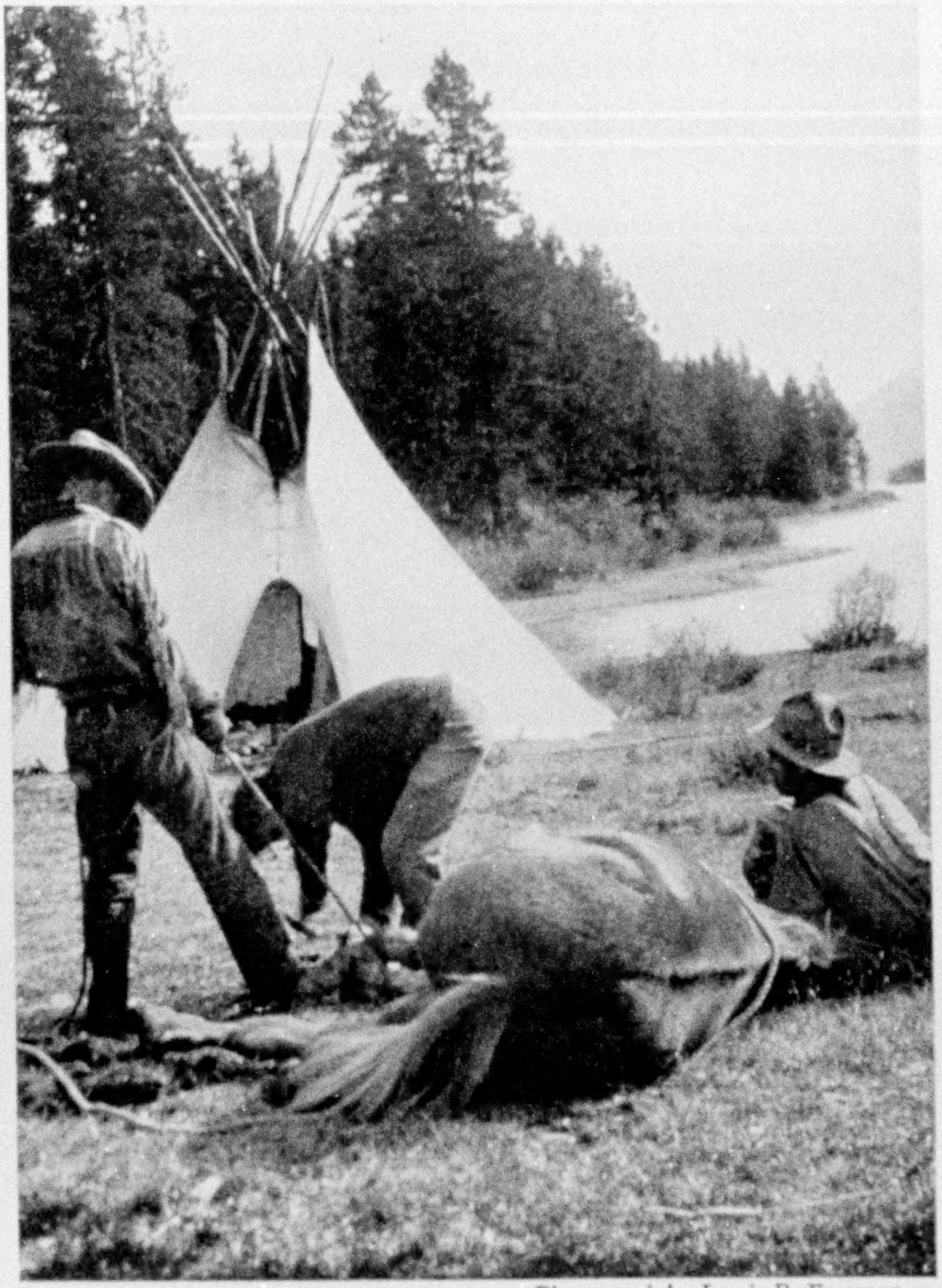
NELLY, THE FILLY, SUMMARILY REDUCES THE WEIGHT OF HER PACK

As it was impossible to ford the Mistaya in the canyons below, the only practicable route to the Saskatchewan was

to retrace our steps around the head of the lakes and go down the western side. This entailed deep, but not especially troublesome, fording, if the horses had had sense enough to keep to the crossings into which they were headed.

Among the animals which thought they knew a better way was the young mare carrying the salt and sugar. She was rolled head under at the little riffle below the ford and was carried down a few hundred feet before she pawed on to solid footing.

The venturesome filly trotted jauntily out, smeared herself with muck by a roll in the nearest mudhole, then galloped on to set the pace for the pack train the rest of the morning.



Photograph by Lewis R. Freeman

SHOEING A REFRACTORY HORSE

The reason for the culprit's blitheness of spirit became known when we unpacked at the end of the afternoon. What with leakage of brine from the salt sacks and syrup from the sugar, Nelly had reduced the weight of her pack at the rate of something better than 10 pounds to the mile all the way to the Saskatchewan.

This must have been the sort of thing which Soapy had in mind when he spoke of letting Nature take its course in the matter of reducing packs.

To do the veteran justice, he seemed as much upset as any of us over the loss, and even promised to punish a possible repetition of the offense by giving Nelly the dried fruit and dehydrated vegetables to carry when we took up the trail again. This he forgot to do, however, much to our ultimate sorrow.

We came down to the Saskatchewan a mile above the point where it receives the Mistaya in the shadow of pinnacled Mount Murchison and just below the junction of the North Fork and Howse River.

Although not more than 15 to 25 miles from its principal glacial sources, it is already a mighty river, varying in width from 500 yards to half a mile, according to the stage.

Nothing allows a river to accumulate volume so rapidly as a series of great glacial reservoirs tapped by its headwaters. In few, if any, of the great mountain systems of the world are these ice feeders located so favorably for the rapid augmentation of flow as in the Columbia Ice Field region.

The Athabaska, flowing north from the Columbia Ice Field, probably has an even

Photograph by Lewis R. Freeman

BUSTER AND HIS MASTER WITH THE RADIO

It was discovered, after reaching the Columbia Ice Field, that the numerous hard knocks and baths in icy streams to which the radio outfit had been subjected had not put the portable set out of commission. From that time it proved a constant source of entertainment, and the party even attempted dog and man power in order to provide gentler transportation for the receiving set when negotiating bad stretches of ice (see text, page 435).

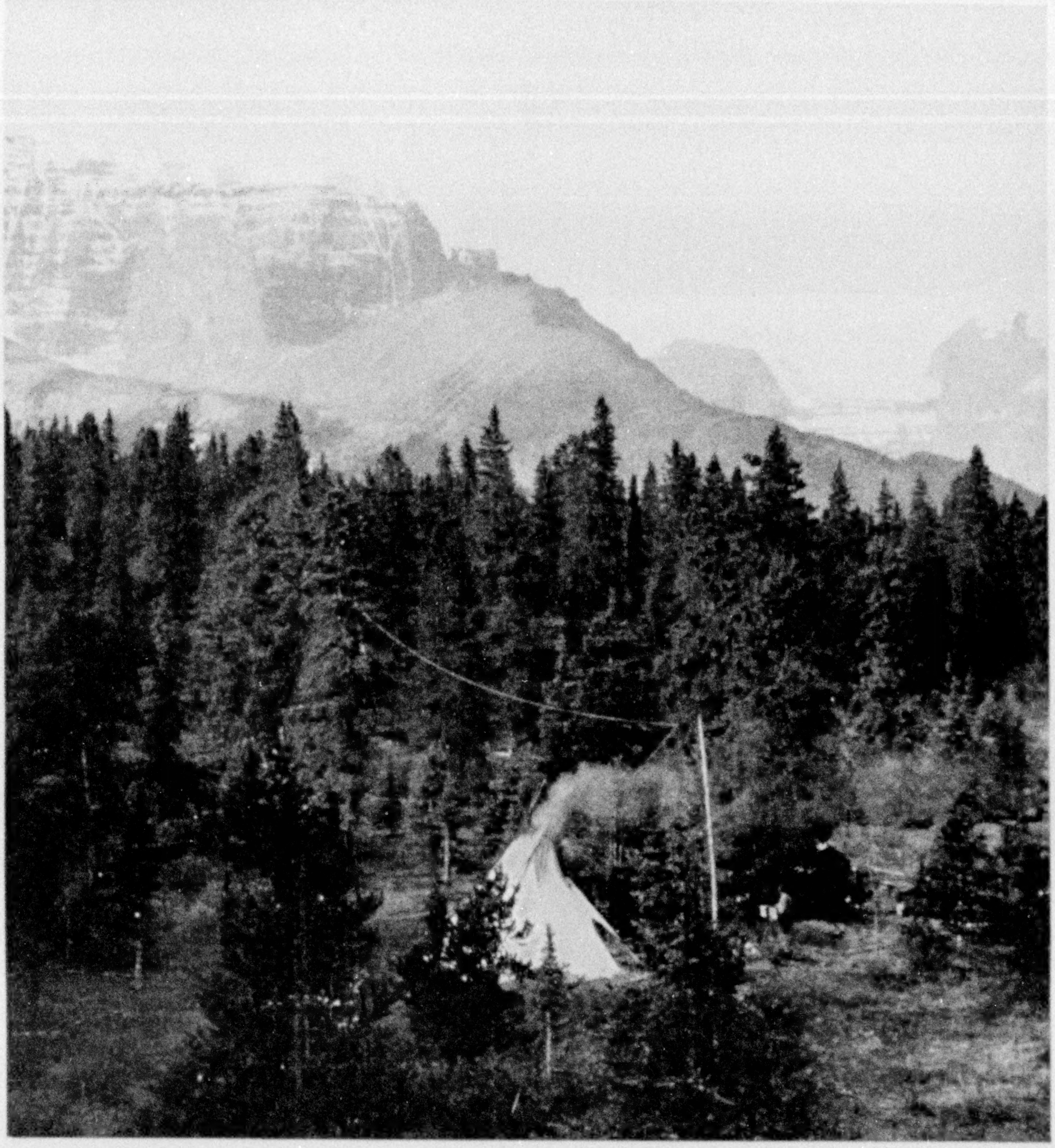
greater volume in its upper reaches than has the Saskatchewan. On the other hand, the drainage to the Columbia, by the Wood and Bush rivers, is much smaller.

Working cautiously from bar to bar and covering perhaps 700 yards of quick-flowing, but not dangerous, water, we reached the north bank without swimming the horses or seriously wetting a pack.

Camp was pitched in the timber at a magnificent point of vantage just below the mouth of the North Fork. Rotting tepee poles, the bent willow frames of steam bathhouses, and deep layers of musty hair scraped by tanners from hides of deer, elk, and moose indicated that the site was once an Indian rendezvous.

ANCIENT INDIAN HUNTING TRAILS LEAD TO THE ICE CAPS OF THE DIVIDE

The Indians of the plains never established permanent habitations far inside the Rockies. That they hunted the vast system to the very rim of the ice caps of the Continental Divide, however, is shown by their long-disused trails, which we



Photograph by Byron Harmon

THE CAMP AT TIMBER LINE UNDER MOUNT ATHABASKA

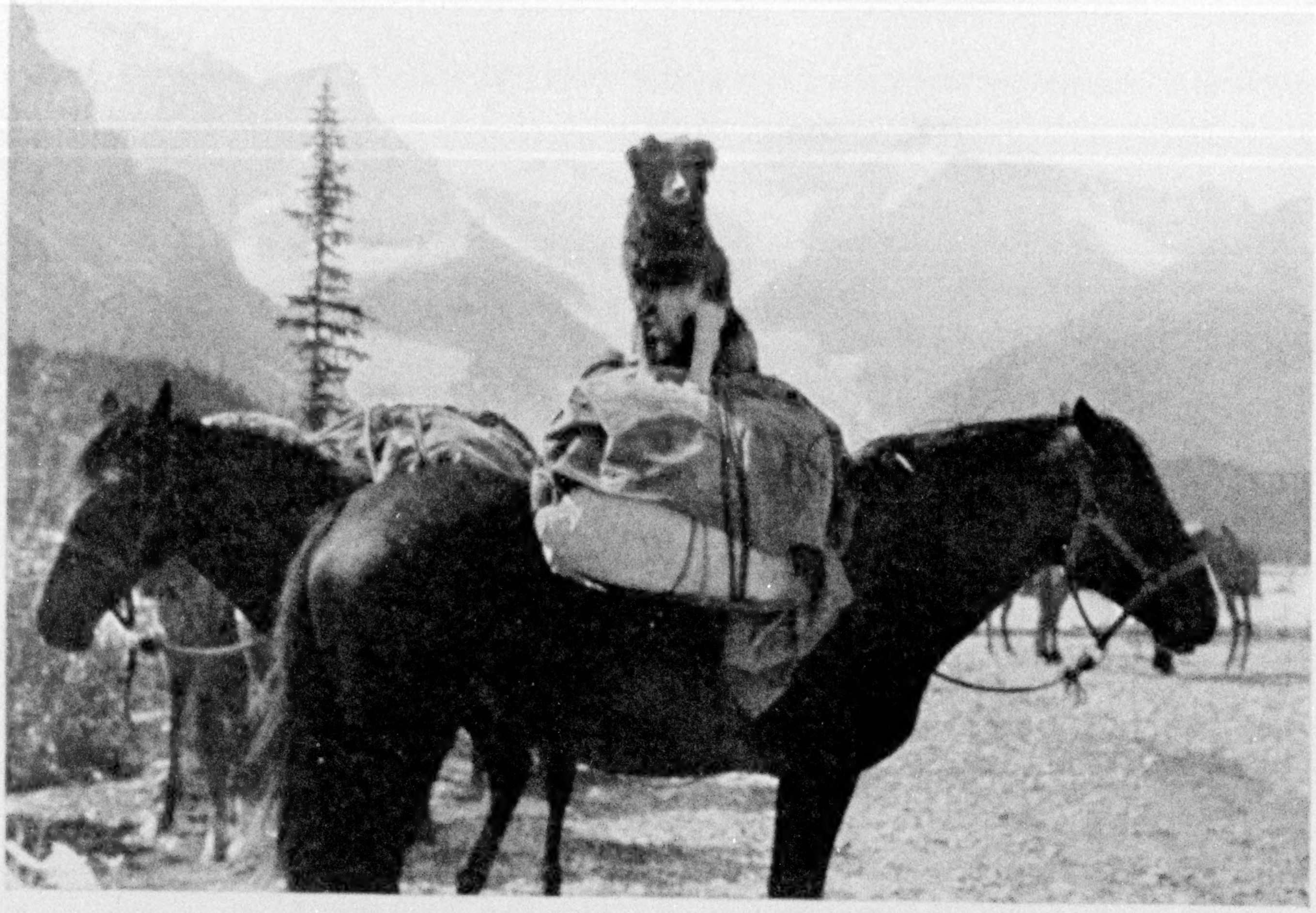
Here the party spent four days, resting the horses and photographing Athabaska Glacier. Note the radio aerial. Interesting programs came in at this point from broadcasting stations in many parts of the United States.

found on every pass and often far down into the timber.

Never breaking down the earth save by the soft pat of moccasins, or by the pressure of unshod hoofs, and rarely, if ever, cutting out timber, fallen or standing, these old hunting parties still left behind them fragments of trails that could be improved only by liberal use of ax and pick. Their grades are invariably as favorable as the topography permits.

Not satisfied either with the lighting or backgrounds for his original motion picture of the pack train crossing the Saskatchewan, Harmon decided to wait over and make another under better conditions. Two warm, cloudy days were unfavorable for pictures, but started one of the heaviest late-summer freshets that the Rockies have known in many years.

The river, fed from its many melting glaciers, rose two feet and probably more than doubled in volume, when the third day brought bright skies and a flood of



Photograph by Byron Harmon

BUSTER RIDING A PACK TO SAVE HIS SORE FEET

hot sunshine. Since the crossing was selected for pictorial possibilities rather than for its facilities as a ford, it was evident at the outset that we were in for a lively time in taking the pack train over the swollen river. Dummy packs of canvas-wrapped fir boughs were substituted for boxes, bed rolls, and regular camp equipment. This plan had the double advantage of giving the horses lighter loads and of effectually precluding possibility of additional soaking of outfit and provisions.

THE PACK TRAIN IS FILMED IN A SWOLLEN RIVER

The river had risen so high that Harmon and La Casse succeeded only on the second attempt in crossing with the movie outfit at the broad, shallow ford which we had waded with so little trouble three days previously. They set up the camera on a high bench on the south bank, just above a point where almost the entire flow of the Saskatchewan was concentrated into a single 200-yard-wide channel, and signaled for us to come on with the pack train.

Soapy led the way; Baptie and I urged on the huddled, reluctant horses from the rear. Buster, our collie-husky crossbreed, rode one of the packs. Tip, our Indian mongrel, had funked a similar seat; so I carried him under my free arm.

Soapy's mare was swimming the moment she stepped off the gravel bar along the shore; likewise the rest of the animals, as they followed suit. Several were ducked head-under as they lost their footing, to come up sputtering and wild-eyed, each eager to climb to safety on the back of its neighbor.

Packs were badly bumped and jostled, with two or three bundles of young Christmas trees breaking loose and floating downstream in mute vindication of our wisdom in substituting them for the sugar and the radio.

Buster was knocked from his seat at the first souse; but Tip, clinging with almost catlike grip, kept hooked on to the crook of my arm.

Orientating themselves as the shock of the first plunge passed, the horses spread out and lunged in the wake of the leader. Soapy was trying hard to keep his mount swimming at an angle that would carry

Photograph by Byron Harmon

FORDING THE SUNWAPTA

In the Sunwapta Valley the pack train encountered a sea of glacial mud which proved far more difficult to negotiate than the river itself.

her out at the only practicable landing on the cut and broken bank opposite.

The swift current was setting him down much faster than had been calculated. Seeing that the only alternatives were to make the landing, or to go on to, and possibly under, a pile of drift logs blocking the entrance of a side channel opening just below, he slid off backward, and towed by the tail to give his horse a better chance. Still failing to close with the landing fast enough, Soapy wisely headed his horse back to midstream, so as to give the drift a wide berth. He then made for a bar where the river broadened and shallowed below.

I would have done better to follow Soapy's lead while there was time and room to avoid the treacherous bank; but with my powerful mount, Jerry, swimming strongly and with plenty of reserve strength, I was reluctant to forego the chance to make the landing as prearranged, and so keep all the pack animals that would follow as near the camera as possible.

We made the bank, but too far down by a scant yard or two. The caving earth broke away under pawing hoofs, and both Jerry and I were well doused when we tumbled back into the icy current.

The shifty Tip, sensing his chance, jumped at exactly the right moment, landing on dry ground with an equally dry hide.

CURRENT SWEEPS MEN AND HORSES AGAINST LOG JAM

I slipped clear of the saddle to give Jerry a better chance to recover his balance, but climbed back with alacrity. The immediately adjacent waters were filled with floundering and more or less upended pack horses. All were in difficulties similar to those of Jerry and myself, and for the same reason.

The next moment the whole mob of us was slapped by the 10-mile current against the jutting jam of logs.

With each horse trying to climb over his wallowing, snorting neighbor, it was exceptionally good luck that no participants in the mêlée were much banged up.

There was not enough water drawing beneath the logs to create a dangerous undersuck, nor yet enough flowing over them to tempt the horses to risk broken legs by climbing the obstruction.

Finally, the current got sufficiently behind the milling mob to roll it around the end of the barrier, where there was straight swimming to the bar below.

Seeing first-class "action" going to waste under the high bank, Harmon brought his long-distance shot to a sudden end and rushed down for a close-up. Setting up with feverish haste, he was just in time for the finale at the log jam.

There was a twinkle in his eye when, a few minutes later, he sauntered up to where we were drying out by doing an Indian dance round a log fire and casually asked if we'd mind doing the first part of that close-up again! Soapy replied with a guffaw on behalf of the horses, while I made similar response on my own account.

We did make the return by swimming the same channel, however, but starting high enough up to work well clear of the cut bank and the jutting log pile.

A BEAR AND HER CUBS FACE THE CAMERA

While filming the rough, steep gorge of the North Fork the following morning, we obtained one of our best wild-animal shots. A black bear was playing with her two cubs on a patch of sunlit rocks. After surreptitiously photographing their amusing antics from a comfortable distance with his long-focus lens, Harmon suggested an interesting variation of action. I was to close in and make our presence known by throwing a stone or giving a lusty yell.

I chose the latter as the less belligerent way of creating the desired diversion.

The effect of my Apache war whoop, delivered from cupped hands not more than 50 feet from three pairs of sharp, back-laid ears, was all that could have been desired. Without even looking in the direction of the blast, that capable old mother swatted swiftly at a cub with each paw, then herded them pell-mell up a near-by jack pine.

The instant the hindmost of the precious pair was clear of the ground, round she wheeled and came charging back to settle with the enemy. Full tilt she came to the brink of the gorge, where, perforce, she came to an abrupt and sliding stop.

That 50-foot-wide canyon of the North Fork was the keystone of our strategy. We and the camera were on one side, the temperamental mother bruin on the other. The film was a complete success, even showing the cubs peeking round their sheltering tree to watch their mother shake an admonitory paw at us.

THE SASKATCHEWAN FLOODS THE FLATS

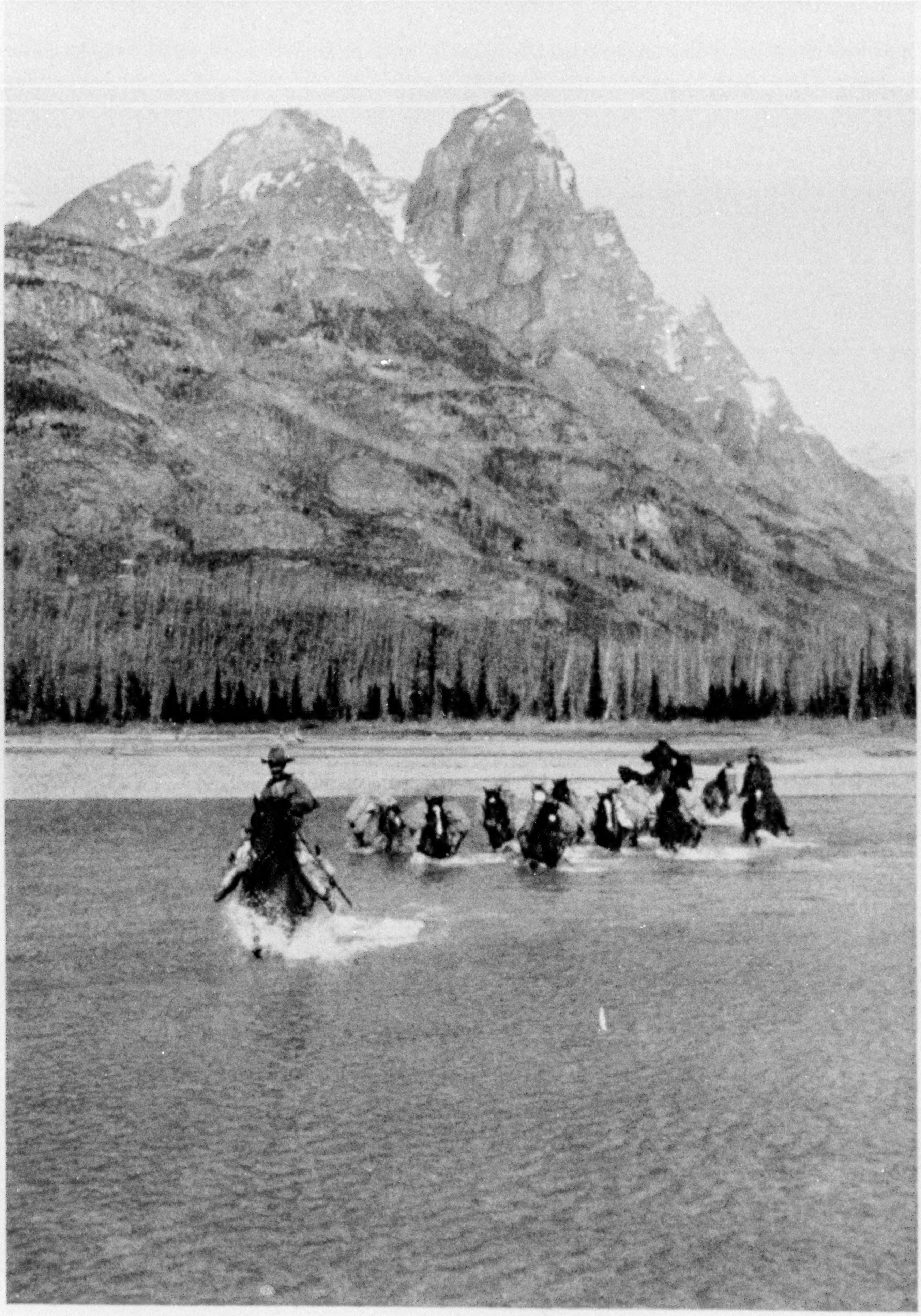
A Chinook wind, warm and soft as new milk, had been playing upon the ice fields to the west and north for three days, followed by hot, brilliant sunshine pouring from cloudless skies, on the morning we resumed our journey.

There was a diamond glitter on the pinnacles of Forbes and the serrated line of its sister peaks along the Continental Divide. Near and far every mountain was streaked with the "downward smoke" of waterfalls, shimmering brocades of jeweled silk in the sunshine, flutters of wind-blown carded wool in the shadows.

The Saskatchewan was out of its banks at the forks, spreading over the flats and encroaching upon the high mark of the spring rise. In the narrow gorge of the North Fork, where the water was up from 20 to 25 feet in three days, what had been cascades and abrupt falls of six feet and more were completely wiped out by a solid white stretch of tumbling torrent (see page 388).

As long as the horses could find footing on the rocky lower slopes of the long massif of Mount Wilson, which bulwarks the North Fork to the east, we were able to avoid the spreading floods on the flats. When talus and snowslide débris finally presented unsurmountable barriers, there was no alternative but to push on up the valley along the inundated bottoms.

Then we learned the meaning of real water trouble. Although successful in avoiding a complete ford of the main river, there were endless networks of back channels to be passed, many deep and steep-banked. With the surging water practically opaque, there was no telling whether the next step would land a horse to his fetlocks or up to his mane.

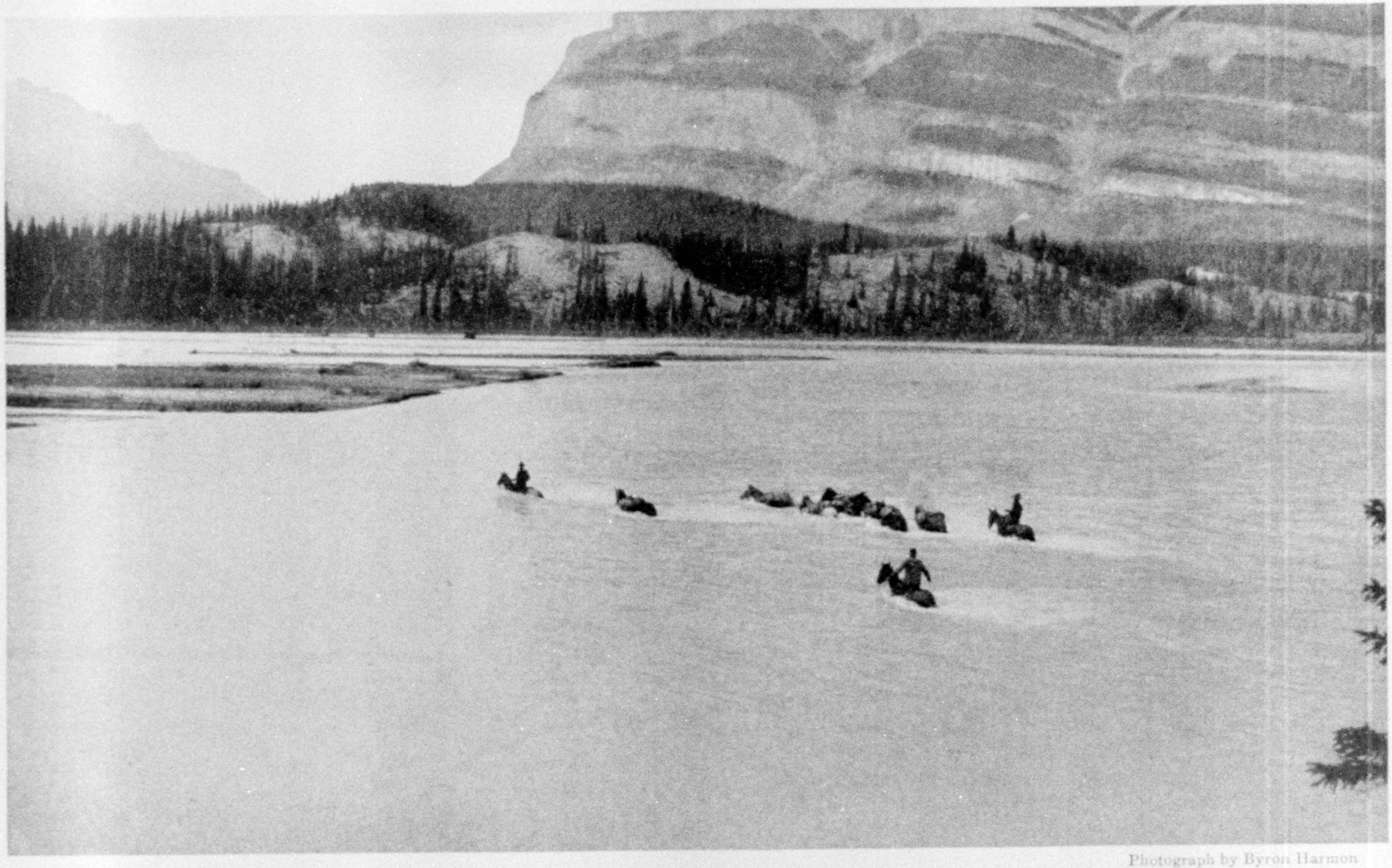


Photograph by Lewis R. Freeman

FORDING THE ATHABASKA RIVER

Some of the meltage of the Columbia Ice Field reaches the Arctic Ocean through this river, which flows into Lake Athabaska, thence into Slave River, Great Slave Lake, and the Mackenzie River (see text, page 379).

XUM



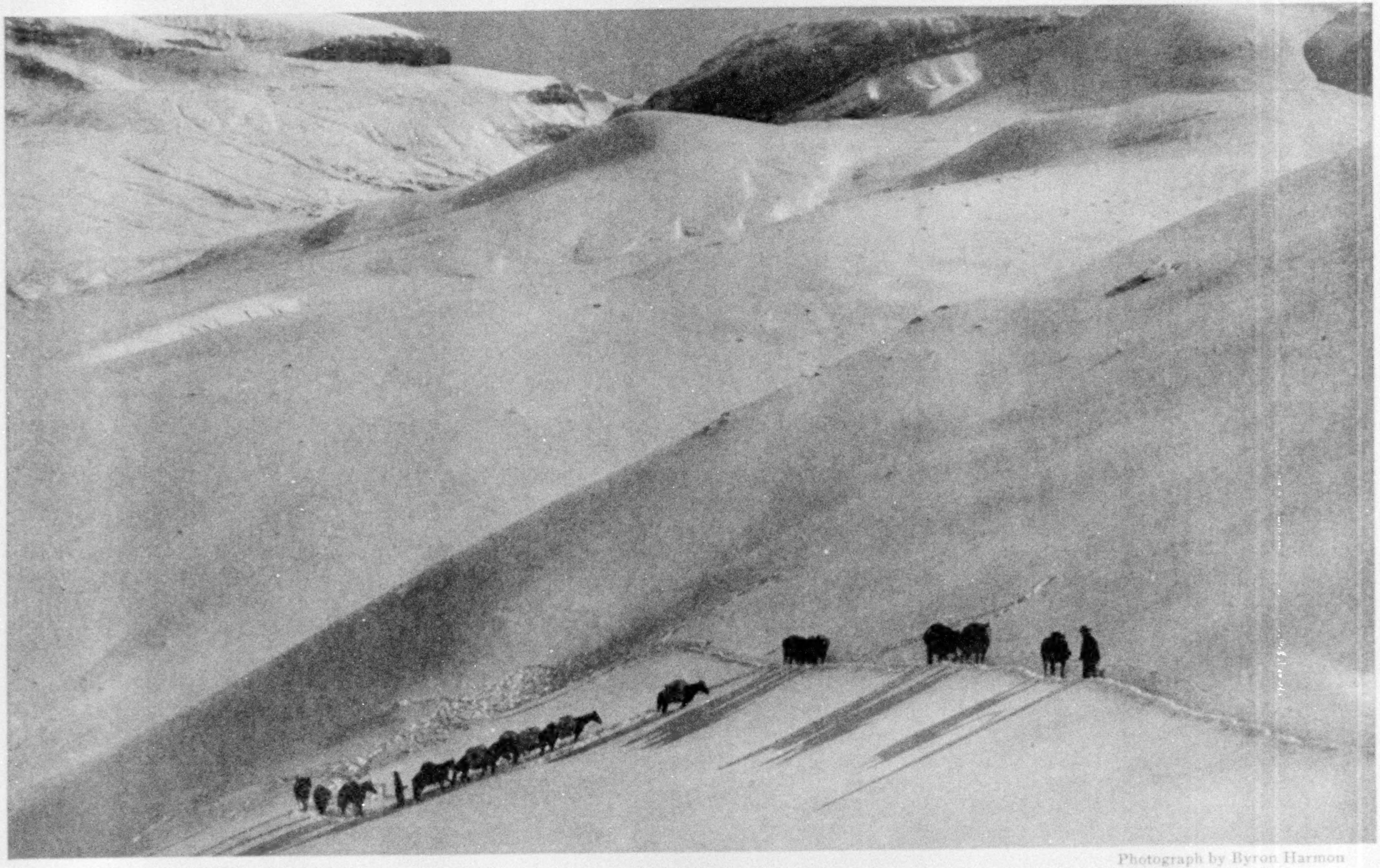
Photograph by Byron Harmon

A DEEP SWIMMING FORD AT THE FORKS OF THE SASKATCHEWAN

In order to get a graphic motion picture of the expedition's pack train crossing this river, the party remained in camp on its banks for several days. In the meantime the waters rose, and when the film was made the swift current not only provided the setting for a thrilling picture, but almost brought the outfit to grief (see text, page 406).

Photograph by Byron Harmon

THE EXPEDITION'S CAMP NEAR THE HEAD OF MALIGNE LAKE, ALBERTA, CANADA (SEE PAGE 446)



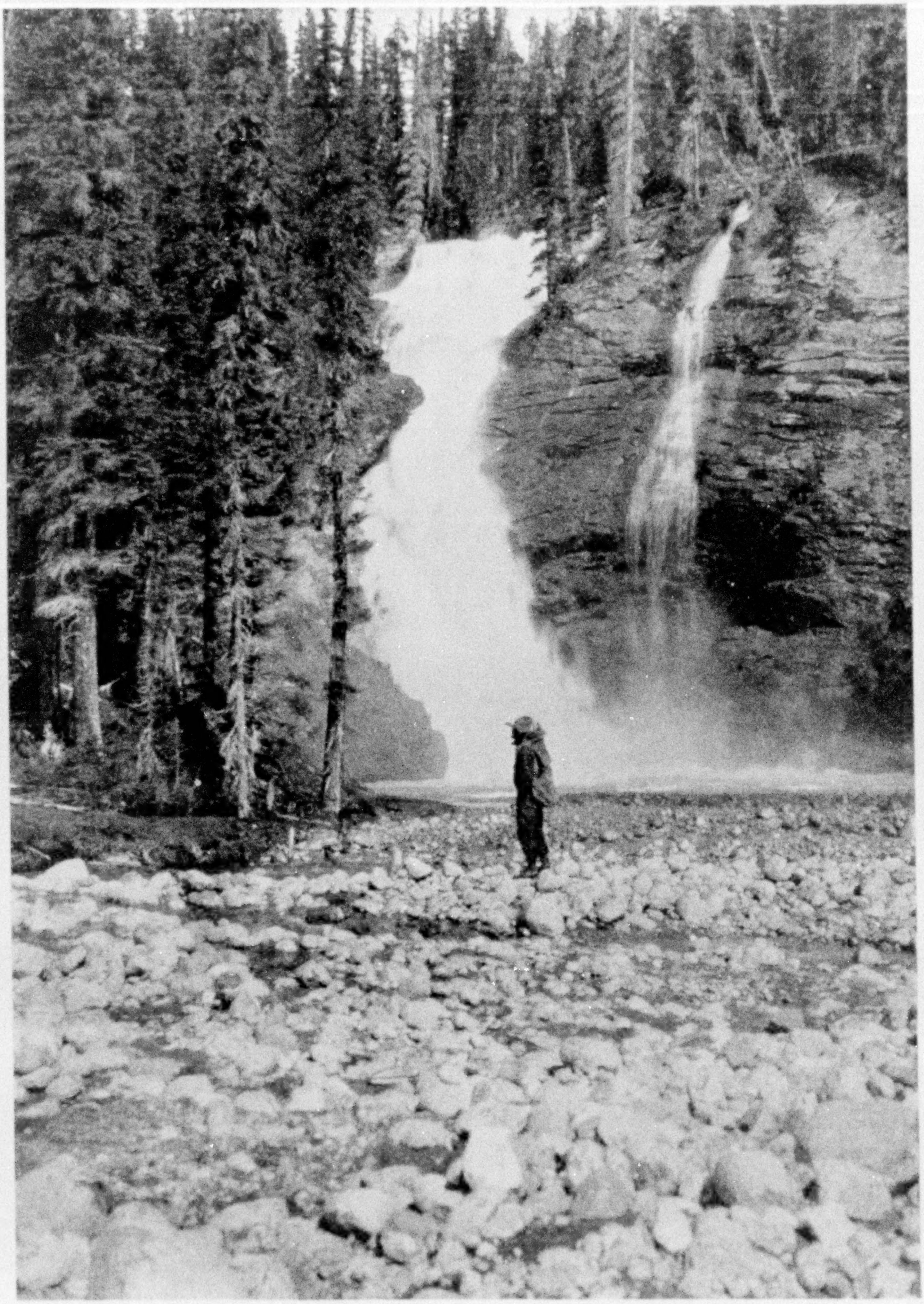
Photograph by Byron Harmon

CLIMBING UP THROUGH FOUR FEET OF SNOW TO JONAS PASS (SEE PAGE 446)

Photograph by Lewis R. Freeman

BLACKMONKS AND CHABA PEAK FROM THE BANKS OF THE ATHABASKA

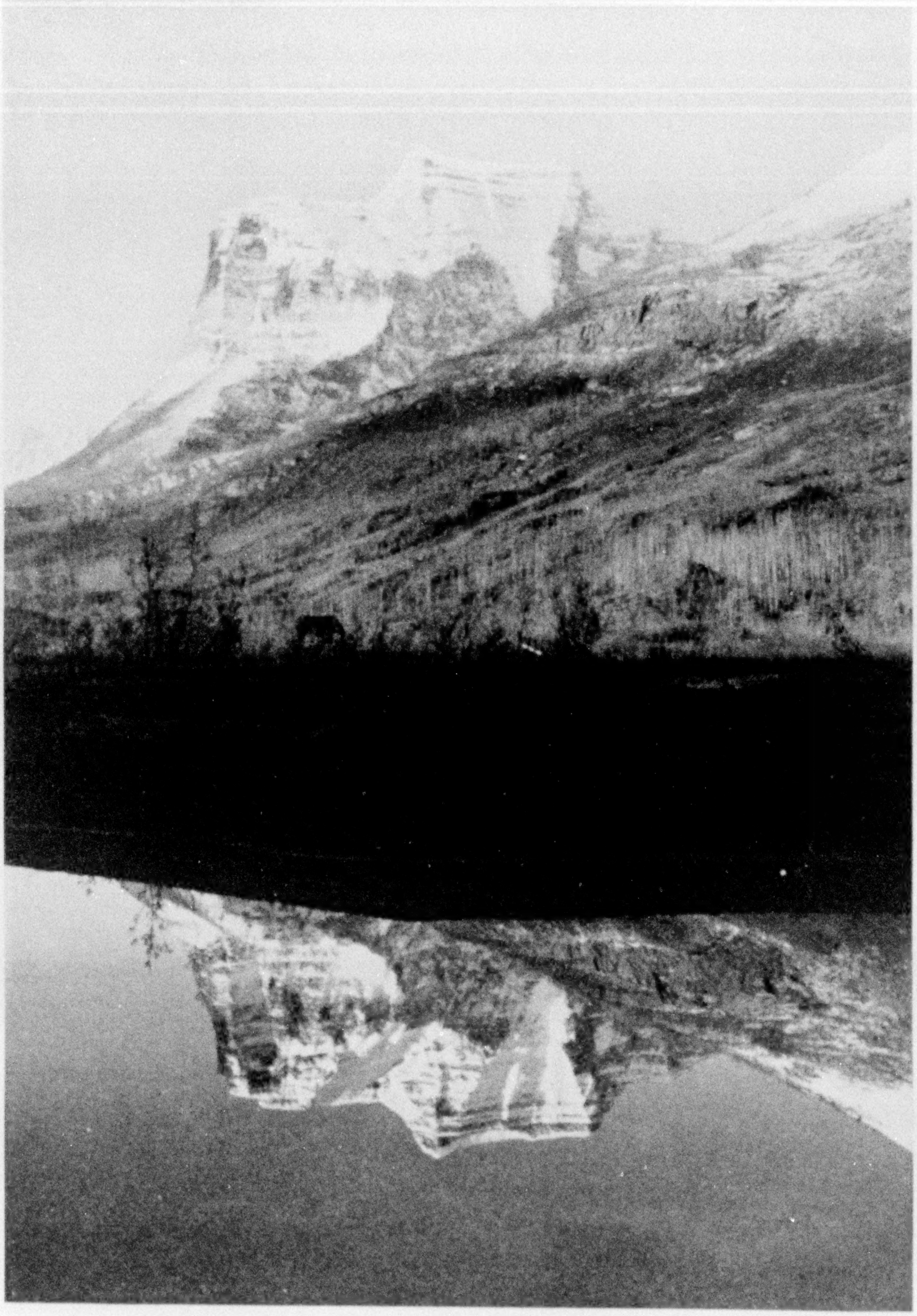
From the mouth of the Chaba the party followed the course of the Athabaska River to Jasper, where additional provisions and winter clothing were obtained for the return journey to Banff.



Photograph by Lewis R. Freeman

A WATERFALL FED BY A STREAM WHICH GUSHES FROM A MOUNTAIN PASSED ON THE CLIMB TO CASTLEGUARD VALLEY

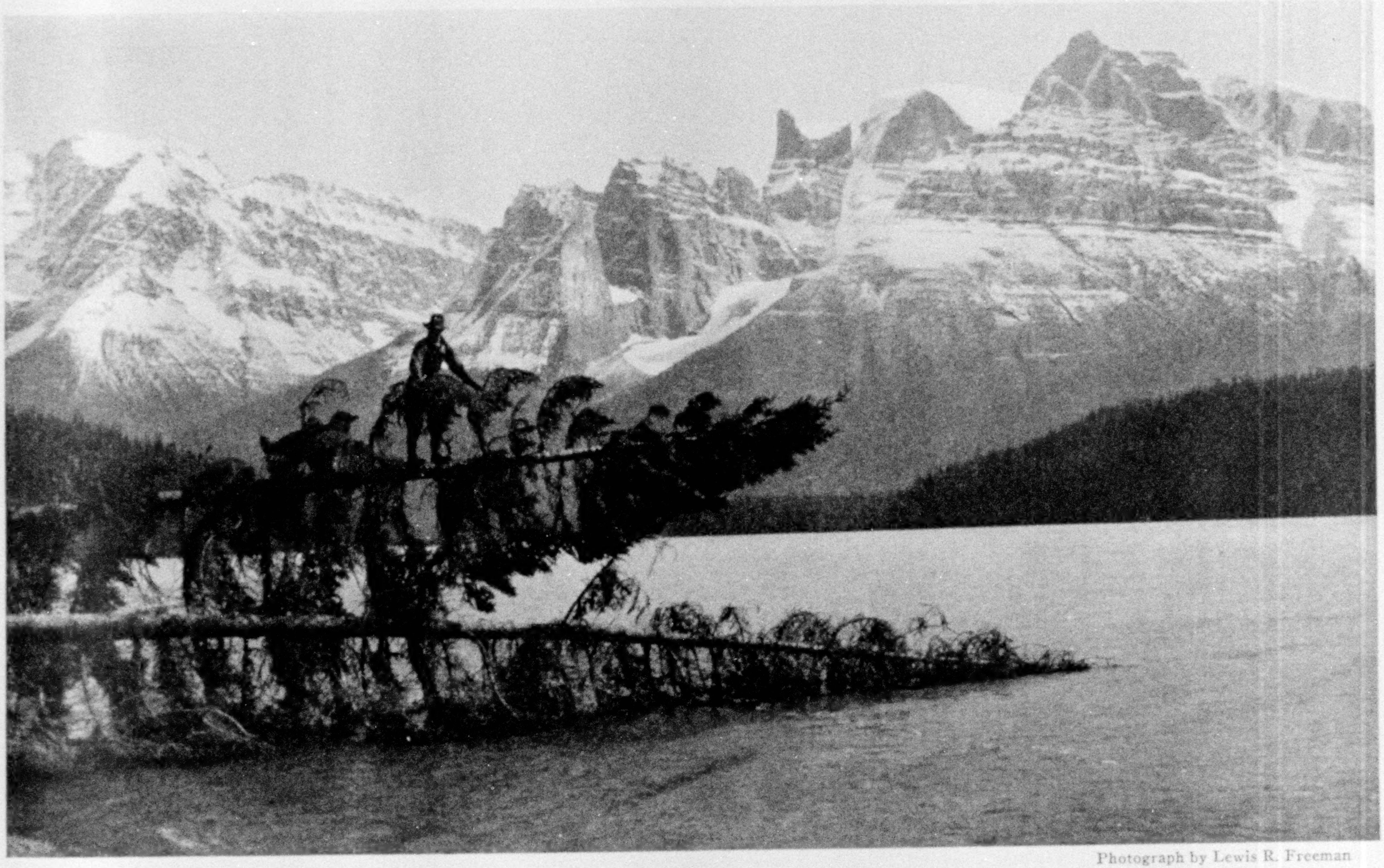
"In my experience I can recall no spring to compare with it in volume, unless it be the one in the Anti-Lebanon which feeds the river flowing through Damascus" (see text, page 429).



Photograph by Lewis R. Freeman

A SNOW-CLAD HEIGHT NEAR THE JUNCTION OF THE CHABA AND THE ATHABASKA RIVERS

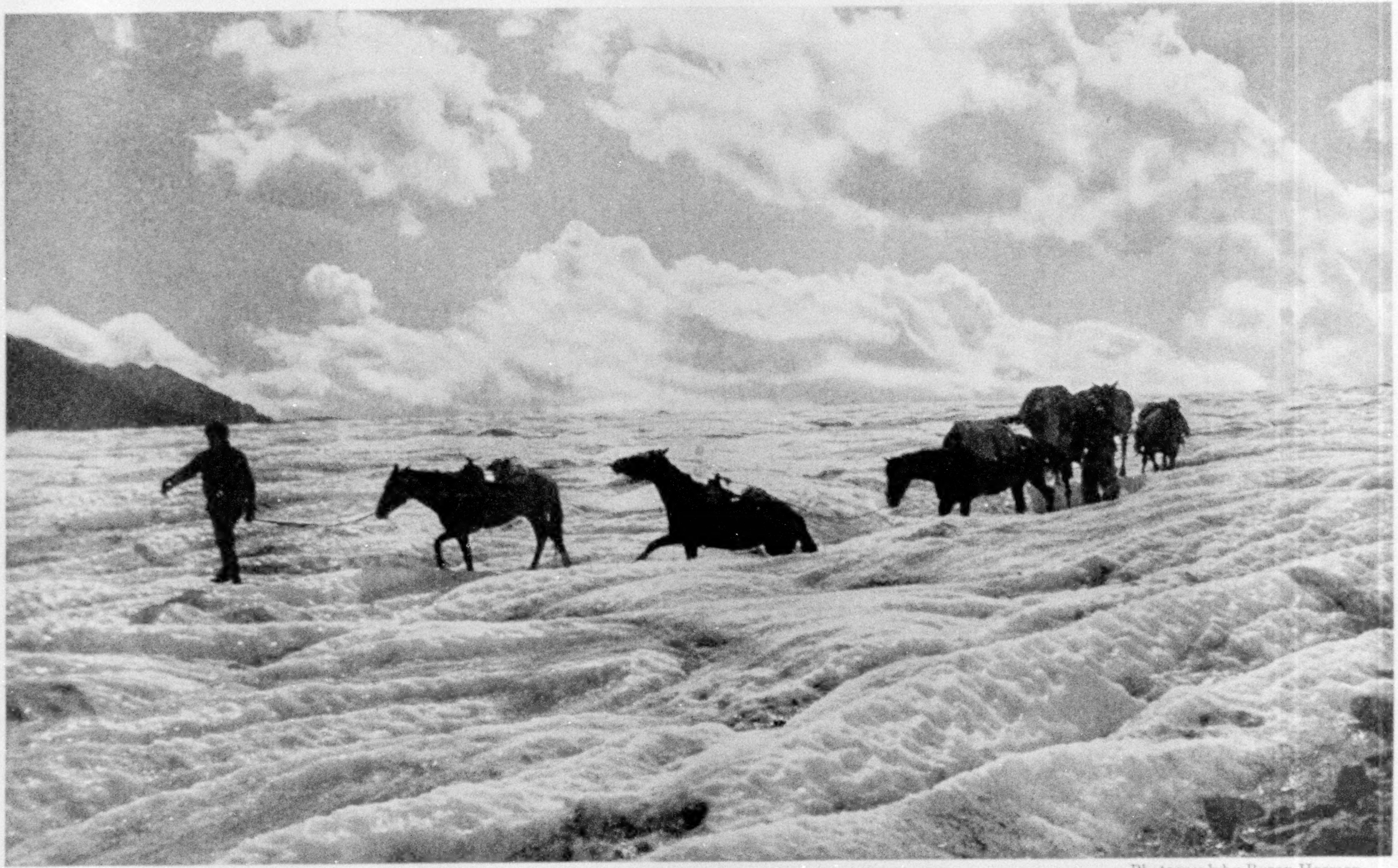
Soon after leaving this point the party picked up a well-cut-out trail, once the transcontinental path followed by the Hudson's Bay Company traders.



Photograph by Lewis R. Freeman

THE SNOWY WALL SURROUNDING FORTRESS LAKE

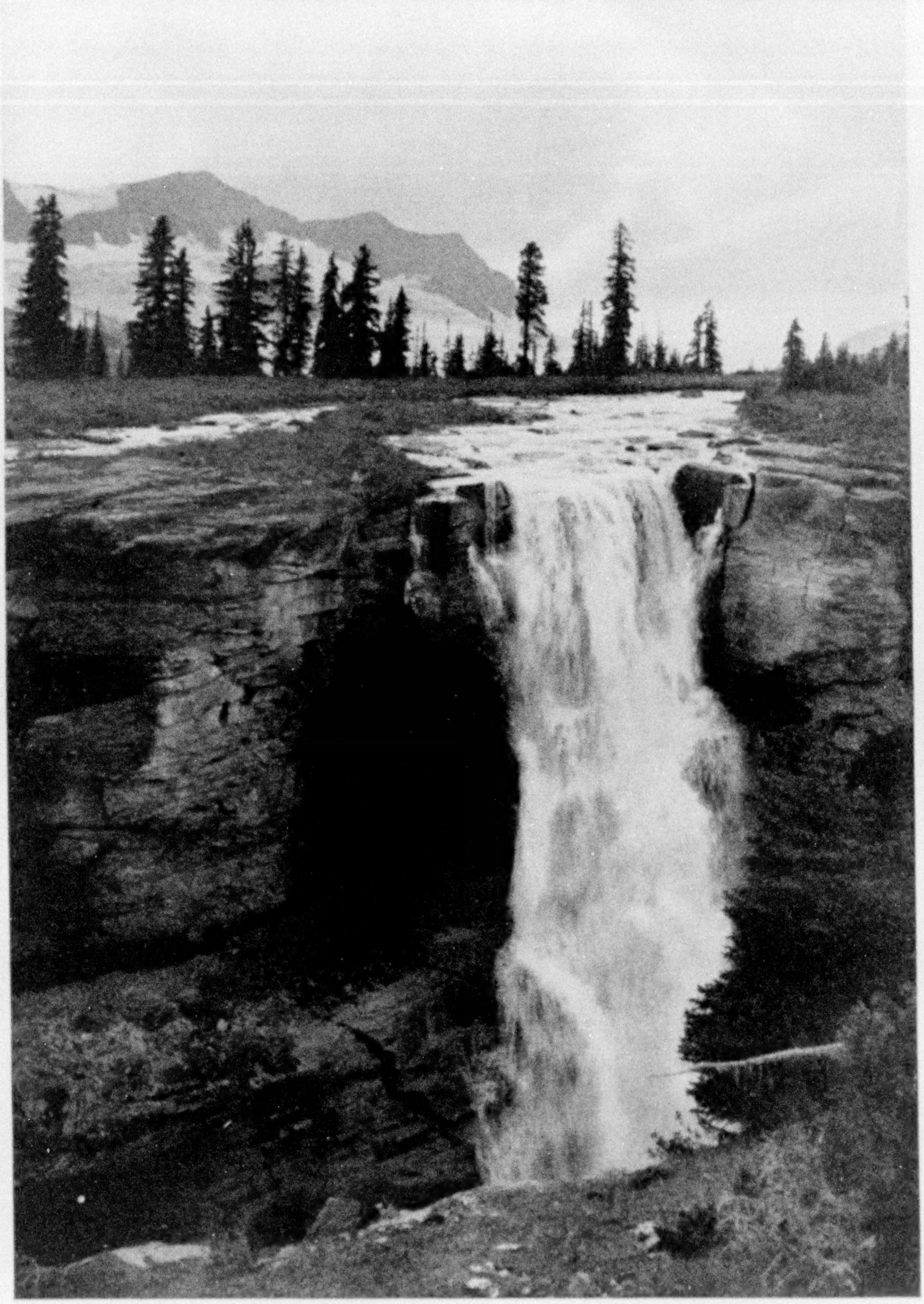
Early traders and trappers tried to establish a new route from Hudson Bay to the Columbia River by way of the Chaba branch of the Athabaska and the silver gorge of this beautiful lake, but they failed.



Photograph by Byron Harmon

ROUGH GOING ACROSS SHALLOW CREVASSES IN SASKATCHEWAN GLACIER

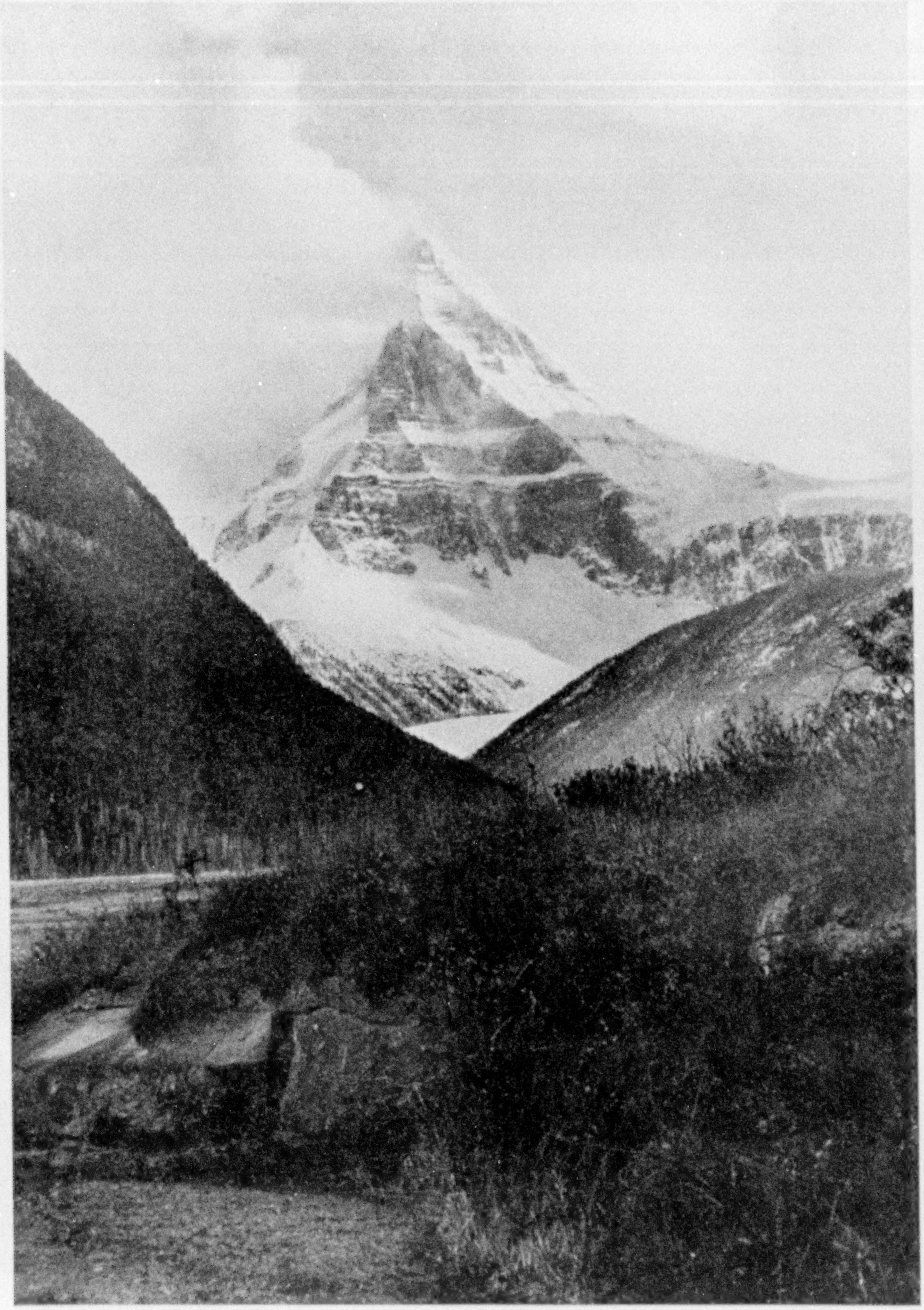
Winding, twisting, and doubling back on the track from time to time, the pack train was slowly worked across the ice. Occasionally, yawning cracks opened into the blue-green depths and turned the party aside. The surface of the glacier proved to be unexpectedly firm underfoot, however (see text, page 437).



Photograph by Lewis R. Freeman

CASTLEGUARD FALLS

The steep, slippery, deadfall-choked trail from Alexandra River up to Castleguard Valley had been blazed by the Canadian Interprovincial Boundary surveyors. This cataract was just below the camp of the Harmon-Freeman party (see text, page 429).



Photograph by Byron Harmon

THE SHARP PINNACLE OF MOUNT COLUMBIA AS SEEN FROM THE NORTH

The members of the expedition waited eight days and endured a 96-hour blizzard, hoping for suitable light conditions under which to photograph this mist-robed mountain. Finally, the clouds parted and for 40 minutes the conditions were ideal (see text, page 443).

XUM

Photograph by Lewis R. Freeman

LOOKING DOWN BOW LAKE

"We pushed through a forest of fine old spruce to a protected and beautiful camp site a few hundred yards back from the north side of the lake, with Bow Glacier, rosy-pink in the sunset glow, reared against the sky line" (see text, page 395, and illustration, page 378).

Photograph by Lewis R. Freeman

A LAKE NEAR THE HEAD OF SASKATCHEWAN GLACIER

The only approach to the surface of the glacier was across broken rock ridges above the head of this lake. It was rough going, especially where the rock and ice were mixed (see text, page 437).

XUM

Photograph by Lewis R. Freeman

CLIMBING TO WHITERABBIT PASS

Photograph by Byron Harmon

ON THE SLOPES OF CASTLEGUARD, LOOKING SOUTH TO MOUNT LYELL AND THE MAIN CHAIN OF THE CANADIAN ROCKIES

The view from Castleguard is one of the great mountain panoramas of the world. Many of the finest peaks of the Canadian Rockies are notched into the view (see text, page 433).

Photograph by Lewis R. Freeman

FLASHLIGHT OF A TEPEE AT NIGHT

The flash has been discharged within the tent, casting the shadows of the occupants upon the canvas wall.

Here we paid the penalty for false courage bred in the horses as a consequence of our little movie exhibition with dummy packs.

HORSES CURE TRAIL TROUBLES BY WATER TREATMENT

Up to that time, nearly all the animals had been extremely nervous about tackling a deep ford; afterwards they had altogether too much confidence. Let the road blazed for them be rocky, boggy, or blocked with deadfalls, and forthwith the leading spirits would bolt toward supposedly easier going in the nearest water, be it the boulder bed of a cascade or the cut bank of a slough.

After a few days we came to understand and to anticipate these outbreaks toward the new freedom; but that first morning on the North Fork we were caught unprepared.

Without blinking an eye, Nelly, the sugar-and-salt horse, walked off a bank of glacial silt that was caving and receding before the attack of the gray-green torrent of the main river. Rolled over and whisked away in an instant, she came up with a blithe snort and started swimming straight for Hudson Bay.

With the 12-mile current and her purposeful pawing, she traveled at five times the speed at which we could force our horses through the brush and mud of the flooded flats, and was out of sight around the next bend before we were well started.

Of course, she had to strike bottom in time, and it was by the best of luck that the intercepting gravel bar, a quarter of a mile below, chanced to run out from our side of the river. Even here the perverse filly was of two minds about rejoining us, stoutly declining to move a step shoreward until La Casse waded out to bring her back.

All the sugar and salt salvaged from this baptism was in the shape of dirty brown chunks. The indurated slabs left after the containing sacks had been dried all night by the fire were reduced with an ax.

Several other packs were badly soaked by plunges into deep water, due to the newborn mania of the horses to cure their trail troubles by hydropathic treatment.

The radio was the worst casualty. It underwent complete submergence when the horse carrying it stepped into the river and was swept down under the horizontal trunks of several undermined pine trees before he found a place to climb out.

As the radio, due to previous disintegrative bangings and bumpings, was already rated a total loss, we were less concerned over its wetting than about that of the sugar and salt. It was now inevitable that even the miserable remnants of the latter must be exhausted weeks before our supply could be replenished.

We pitched camp opposite the mouth of the Alexandra late in the afternoon, having made about eight miles. Several horses were so played out that they were unable to stand until their packs were removed.

SOAPY LEAVES A NOTE

The human elements of the party were holding up fairly well physically, but the mental atmosphere of the camp was well reflected in a note which Soapy wrote, to be left on a forked stick for a guide who was expected to follow later with a hunting party. Slightly expurgated, this missive concluded as follows:

> "If you need any sugar or salt, dip it out of the Saskatch. Nine-tenths of ours is already in the drink and the rest most likely goes to-morrow. If you see any horseshoes floating downstream, look under them for my cayuses. Deep-water navigation by pack train ain't what it's cracked up to be."

Another humid night, succeeded by a clear, hot day, brought still higher water. We crossed the score of scattering channels of the North Fork without trouble, only to find the whole lower flat of the Alexandra turned into one unbroken lake.

There was no way of avoiding it, save by heading the pack train up into the thick-growing timber of the very steep slope to the north. Constantly reslinging packs and rounding up the scattered animals, we had made scarcely more than a mile by early afternoon. To reach the nearest practicable camping ground before dark, therefore, left no other alternative but to drop down to the flooded flats.

These were still completely covered where we pushed out on them, but with

Photograph by Lewis R. Freeman

FORDING THE SUNWAPTA WITH THE RIM OF THE COLUMBIA ICE FIELD ON THE SKY LINE

much less water here than below. Splashing on as best we could, a point was finally reached where there were occasional stretches of solid going between the long, deep fords of the quickening river.

We unpacked the jaded horses at 6 o'clock on the rough, sloping boulder fan of a glacial torrent pouring down to the Alexandra from an ice field to the south.

THE TIRED HORSES LIE DOWN WITH THEIR PACKS

The next day the river was swifter and narrower, with broad, hard gravel bars between the winding channels. It was much better going than on the previous day, but the horses, weak from overwork and underfeeding, had trouble at the constantly recurring fords.

At the end of three miles, all were straggling badly, with several persisting in lying down with their packs. When another mile brought us to a good camping ground not far below the Alexandra Glacier, we were glad to stop.

Following a night in better grass, the horses were stronger—a fortunate circumstance in view of the fact that the final stage of our climb to the level of the Columbia Ice Field promised to be arduous.

A mile and a half over a densely timbered ridge brought us back to the main, or north, fork of the Alexandra, usually called Castleguard River. Flowing in a

Photograph by Lewis R. Freeman

ATHABASKA GLACIER FROM WILCOX PASS (SEE TEXT, PAGE 442)

half-canyoned valley, its declivity was such that gravel and mud had been carried down to the flats, leaving behind only a channel choked with boulders, many of unstable equilibrium.

Torrential water tumbling over boulders makes almost prohibitive fording conditions. A horse may break a leg in the wink of an eye, while footing once lost may be quite impossible to regain.

We took every possible precaution in the two crossings we had to make and felt ourselves fortunate that nothing worse than wet packs resulted. Several horses were carried down 100 feet or more at both fords, but luckily found sloping bars upon which to clamber out.

These, with two or three crossings of the Sunwapta and Athabaska on the Arctic side of the Divide, were the most dangerous fords we had.

UNDER THE EAVES OF THE CONTINENTAL ROOFTREE

We were now practically at the fountainhead of one of the main sources of the Saskatchewan—under the very drip of the eaves of the continental rooftree. To the east was the rocky summit of Mount Saskatchewan. To the south the peaks of the Lyell massif glittered in solid, unbroken white. To the west, almost directly above us, towered Alexandra, Spring-Rice, and Bryce. To the north were Athabaska, the Twins, and Columbia, but cut off from our vision at

Photograph by Lewis R. Freeman

MIDWAY UP THE ATHABASKA GLACIER

the moment by the more imminent loom of the southern bulwarks of the great Columbia Ice Field.

Most of these peaks were more than 11,000 feet in height, two of them more than 12,000.

We had penetrated to the very heart of a kingdom of ice and snow, on a day when all of it seemed to be melting. The glaciers spewed out raging torrents of savage power, and besides the streams from melting ice and snow, the mountain sides were streaked with rivulets from countless underground springs.

Many of these subterranean flows were of great volume, notably one which fed a splendid waterfall immediately below the point where we left the Alexandra for the steep climb to Castleguard Valley. The stream from this fine cataract seemed to furnish more than half the flow of the whole river. Yet our explorations later revealed that all of it gushed from the mountain side not more than 200 feet above the brink of the fall.

I am inclined to think that 1,500 second-feet would be an underestimate of the flow at the time of our visit. In my own experience I can recall no spring to compare with it in volume, unless it be

Photograph by Lewis R. Freeman

ON THE EDGE OF A CREVASSE IN THE ATHABASKA GLACIER

the one in the Anti-Lebanon Mountains which feeds the river flowing through Damascus, and which tradition claims sprang originally from a footprint of Abraham.

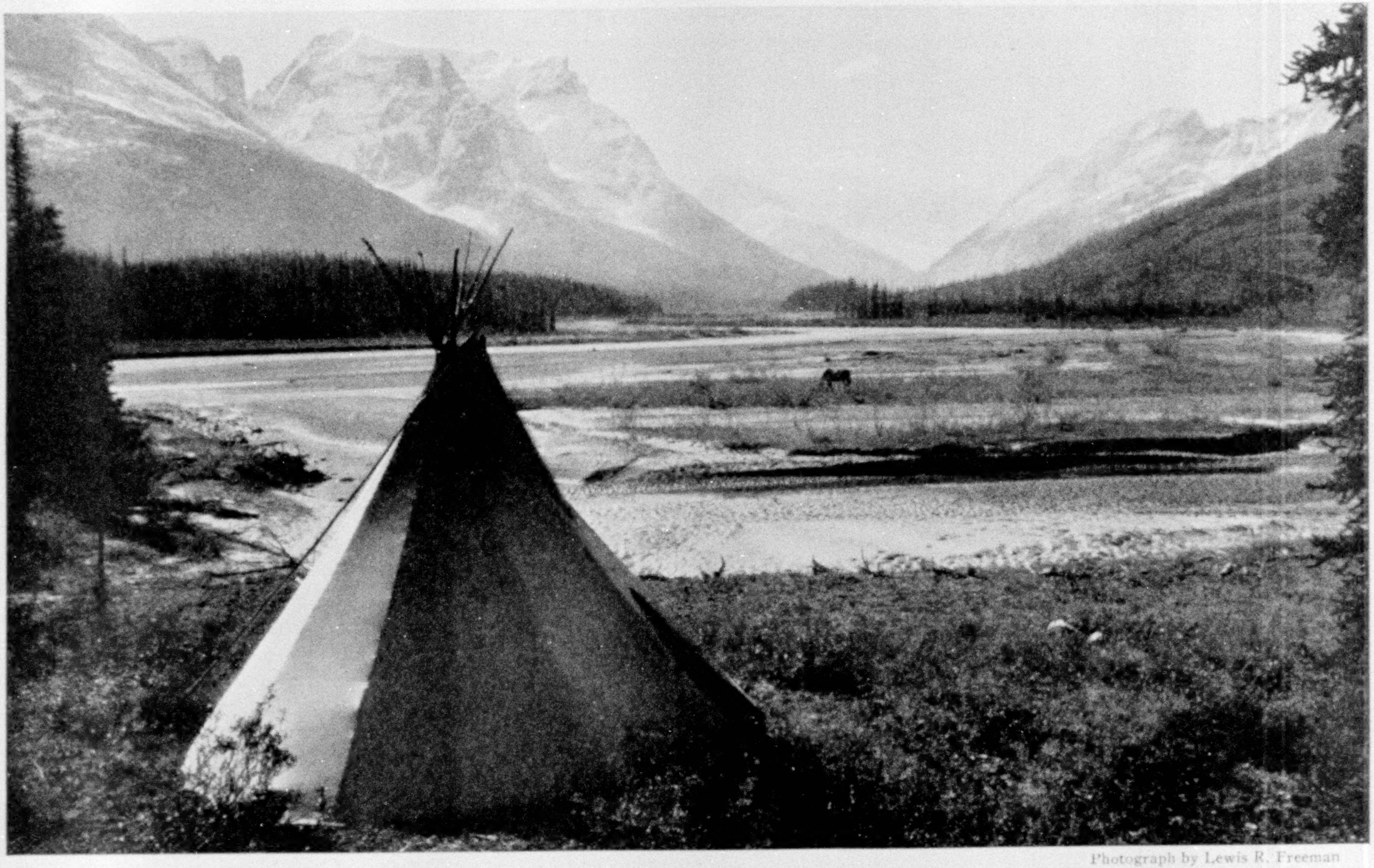
The trail from the river to the Castleguard Valley was blazed by the Interprovincial Boundary surveyors and has been used several times since by mountain-climbing parties. Steep, slippery, and deadfall-choked though it was, the going was infinitely preferable to the punishing grind in mud and water we had endured since leaving the forks of the Saskatchewan.

And the valley itself—a thousand acres of mountain meadow with perpetual ice on three sides—was a near-paradise.

Although at the verge of timber line, stunted but close-growing fir and spruce provided wood, tepee poles, and shelter from the wind. A streamlet flowed past the cook-tent door. Knee-deep grass up the valley promised a feast for our half-starved horses.

Nothing but the smoke of our own camp fire could cut us off from the pinnacles of Spring-Rice and Bryce, notching the sky line to the west, or the buttressed heights of Castleguard, lone sentinel of the Columbia Ice Field to the north. A 20-foot cascade on the river above the camp and a 100-foot sheer fall just below were the crowning touches in a picture etched deep on the tablets of memory (see pages 394 and 414).

Our work at this camp was to film the superb panorama from the summit of



Photograph by Lewis R. Freeman

LOOKING UP THE CHABA VALLEY TO THE CONTINENTAL DIVIDE

The party enjoyed a rest of three days at this camp, where the horses found good grazing and recuperated from the hardships of the eight-days stay near the glacial source of the Athabaska (see text, page 440).

Photograph by Lewis R. Freeman

LOOKING ACROSS FORTRESS LAKE TO CHABA PEAK

From the camp at the Chaba (see opposite page) a hurried side trip was made to this body of water, which sits on the Continental Divide and drains two ways.

Photograph by Lewis R. Freeman

A PENINSULA ABOVE THE NARROWS OF MALIGNE LAKE, ALBERTA

Here three days were spent in October, and when the return journey was resumed heavy snow was encountered in the passes.

Castleguard. This striking peak, though little more than 10,000 feet in height, is so located as to offer a unique vantage for viewing or photographing the great Columbia *mer de glace,* with the stupendous walls of mountains surrounding it.

We were anxious for at least two hours on the summit during which there would be not only local sunshine, but a clear sky line of peaks in every direction. Such an ideal day might occur not over once or twice in a summer, but we were prepared to wait for the nearest possible approximation to it.

The sudden break-up of the humid Chinook spell, followed by a violent snowstorm of almost blizzard magnitude the day after our arrival, seemed to point to a long, tedious wait. Then another kaleidoscopic shift brought just the day we were looking for, or at least a morning which promised to develop into such a day.

As practically the whole 3,000 feet of climbing was over ice or snow, there was no chance to use the horses.

For a real mountain-climbing party, the ascent of Castleguard is comparatively easy. Harmon and La Casse were fairly experienced, but the packers and I were novices. Our heavy movie camera and tripod, four still cameras, and much incidental impedimenta averaged for each of the five of us possibly two or three times the weight ordinarily carried by the alpinist.

And so we made a hard, tiring pull of it, with many halts to regain breath and to massage incipient cramps out of knotting muscles. The last 1,000 feet were the steepest, and steps had to be cut with an ice ax for most of the distance.

Personally, I was extremely glad of the sustaining pressure of a rope during the precarious clamber up a "chimney" just below the summit.

THE GREAT PANORAMA FROM MOUNT CASTLEGUARD

Possibly lacking the sheer, breath-taking wonder of the first sight of Kinchinjunga's snows from Darjeeling, the view from the summit of Castleguard is still one of the great mountain panoramas of the world. Set on the southern rim of the Columbia Ice Field, with no other peak encroaching on its domain for many miles, there are no masking barriers close at hand to cut off the view in any direction.

Not only are many of the finest peaks of the Canadian Rockies system notched into the splendid panorama, but some of the Selkirks and Gold Mountains, far beyond the purple-shadowed depths that mark the great gorge of the Columbia River.

The first white man to see the Columbia Ice Field was J. Norman Collie, in 1898. It was he who named Bryce Peak, after the late British Ambassador to the United States.

This is the dominating peak in the panorama unfolding from most of the Columbia Ice Field. Mount Columbia, with an altitude of 12,294 feet, is the highest summit in this region of the Rockies, and ranks second only to Robson in the Canadian system. Seen from anywhere to the south, however, it appears comparatively insignificant, probably due to the foreshortening of the long slope up from the great ice field. This rounded hummock of snow can hardly be recognized as the slender Matterhornlike pinnacle we were later at such trouble to photograph from the head of the Athabaska (see text, page 442, and illustration, page 419).

Presenting even more contrasted views, as seen from the south and north, is the Snow Dome. Although the altitude of this remarkable eminence is 11,340 feet, the slope to its summit from the Columbia Ice Field looks gradual and smooth enough to be navigated by an automobile; yet the northeast side is an almost sheer cliff of 5,000 feet to the upper flats of the Sunwapta.

It is the Snow Dome which forms the hydrographic apex of the drainage of the Columbia, Athabaska, and Saskatchewan.

The deep purple-indigo dome of the sky looked clear enough to last a week, as we struggled up to the top of Castleguard. Harmon, however, was too experienced in Rocky Mountain summer weather to presume upon momentary fairness. Seeing a vaporous boil of dark clouds beginning to surge against the barriers above Columbia's gorge, he set up his cameras and cranked off film in feverish haste.

XUM

Photograph by Byron Harmon

THE PACK TRAIN CLIMBING UP TO JONAS PASS

In the lower valleys the snow was from six inches to two feet deep; in ravines the party had to break its way through drifts of from four to six feet.

Two complete panoramas were made—one with and one without a filter on the lens. Photographs of individual peaks were also made with the telephoto lens and "slow-turn" exposures on the progress of the gathering clouds across the face of Mount Bryce. A round of shots with the various still cameras gave us everything we came for, and under almost perfect conditions of light and air.

We finished in the nick of time. Before the cameras were packed, the vanguard of the mists was pushing up the slopes from the west, to come swarming over the top as the last man took his place on the rope and we started to descend.

Going down, as is usually the case with a novice, I found more trying than climbing up. Two or three times, when my dangling heels refused to find holds in the chimney, the rope was more than an ornament.

THE COOK FALLS INTO A CREVASSE

Hardly had we kicked free of the rope at the foot of the steepest pitch when La Casse, loping on ahead with the dogs over apparently unbroken snow, dropped completely out of sight. He reappeared an instant later, having caught one foot on a ledge just under the brink of the crevasse.

The latter, thinly but entirely bridged

Photograph by Byron Harmon

FACING WIND AND BLOWN SNOW ON CASCADE PASS

by the drift from the late snowfall, was of great depth, its smooth green walls disappearing from sight far below the length of our rope.

In Dr. J. Monroe Thorington's interesting record concerning his ascents of a number of mountains of the Columbia Ice Field in 1923, there is this concluding sentence in his account of the return from Castleguard:

"It was a day of enjoyment for all, although the disappearance of our cook in a small crevasse frightened us badly."

By an interesting coincidence, it was not only the same cook, but almost certainly the same crevasse. As old Soapy commented: "Seems like there's two things cooks is most always pretty near losing—their tempers and their hides!"

As a matter of fact, La Casse was not only extremely good-tempered, but also probably the best mountain man of the party.

THE RADIO FURNISHES ENTERTAINMENT AND NEWS

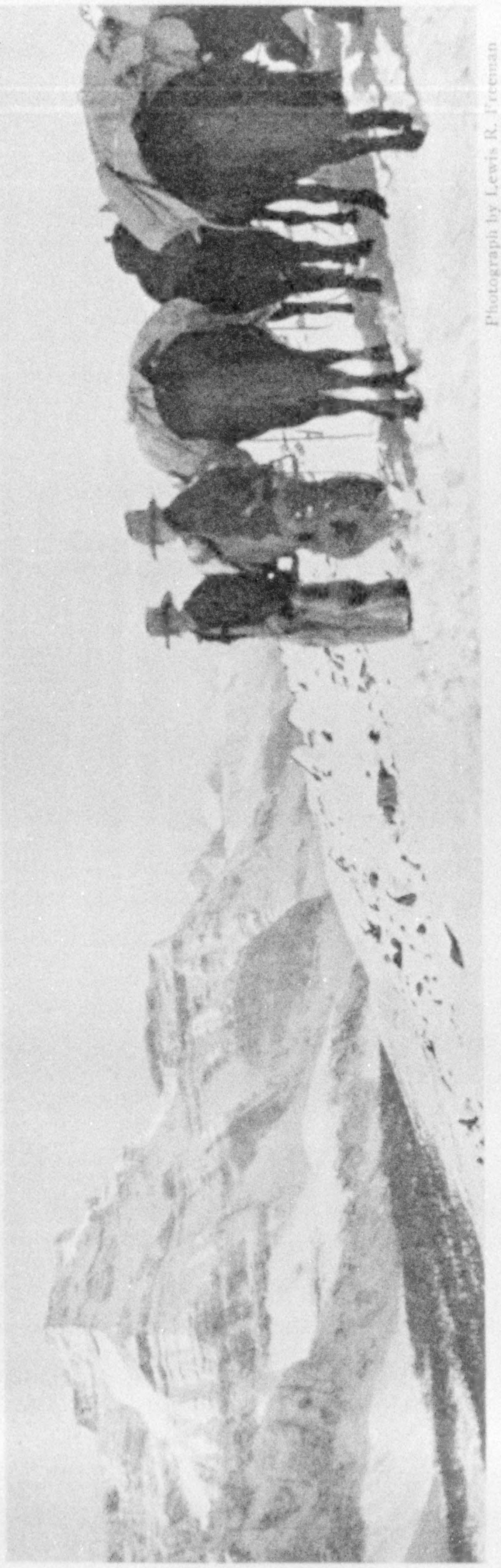
While overhauling and shaking down the outfit in preparation for the grind across the ice field, we discovered that not all the bangings and soakings to which it had been exposed had seriously affected the radio. Although there was something loose in every tube, not one refused to light when connected with the batteries.

This encouraged us to string up the aërial hastily, with the astonishing result that stations as far apart as Oakland and Pittsburgh came in very strongly that afternoon and evening.

A windstorm tore down a limb of a tree supporting the aërial and put a premature end to this first trial. But we had heard enough to know the radio was going to prove a very interesting companion.

From that time on, we protected it much more carefully, even attempting dog and man power in order to provide gentler transportation for it over several bad stretches of ice (see page 404).

Our care was well rewarded. For the next six weeks there was hardly a night in which we did not get at will several of the strongest major stations of the country, with odds and ends of minor ones coming in unexpectedly. We heard a complete opera rehearsal in San Francisco, from the Oakland station; most of the



Photograph by Lewis R. Freeman

LOOKING DOWN THE VALLEY OF JONAS CREEK TO SUNWAPTA FROM THE JONAS-POBOKTAN DIVIDE

Wills-Firpo fight, rebroadcast blow by blow from the ringside by Hastings, Nebraska; and midnight programs of song and jazz from Pittsburgh on many occasions.

The regular daily-news summary, which came best from Oakland and Vancouver, was the greatest treat of all.

A carrier-pigeon letter, sent out by Banff to an editor in San Francisco, was read back to me, with a reply, from the powerful Oakland station a week later.

Our purpose in traversing the length of the Saskatchewan Glacier with the pack train was twofold. That route would save from 40 to 50 miles of flooded flats in getting around to the north side of the Columbia Ice Field; it would also give us a far more intimate glimpse of the great ice field itself.

Heavy as the possible penalty of failure might be, the chance was worth taking on either score. We were the more sanguine of success since this same route had been traversed the previous year by the Thorington party.

La Casse, who had been on this initial venture, undertaken in June, thought we would find conditions less difficult in September. This was on the sound theory that, with most of the winter's snow gone at the later date, there would be firmer footing on the solid ice of the glacier, with less chance of stumbling into thinly covered crevasses.

THE DIFFICULT APPROACH TO THE SASKATCHEWAN GLACIER

Anticipating difficulties on the ice, we broke camp and started up the valley very early on the morning of September 6. An hour and a half of steady climbing took us over the divide at an elevation of about 1,000 feet above timber line. A mile almost on a level, with a slight descent at the end, brought us out by a beautiful little ice-walled lake at the side of the glacier.

The easiest point to reach the ice—a rounded depression at the foot of the lake—proved impracti-

cable because of a broad swath of unfathomable glacial mud.

The only approach was across the broken rock ridges above the head of the lake, where we had already found evidences of the passage of the previous party. It was terribly rough going, especially where the ice and rock were mixed in a vile conglomerate; but the pack train was worked across without serious trouble.

At the edge of the ice the horses were tied head to tail in groups of three or four, each group to be led by a man on foot. This gave more satisfactory control and prevented straying when out among the open crevasses.

La Casse, with one group, took the lead; Baptie, Soapy, and I followed with the other three. Harmon, leading only the horse with the motion-picture camera, scouted on a roving commission.

The horses, although in fine fettle after five days' feasting among the juicy mountain-meadow grasses, took the work seriously and showed little desire to bolt or hang back. Plainly, the strangeness of their surroundings and unstable footing had a sobering effect.

The day was even more nearly perfect for photographic work than that on which we had ascended Castleguard. There was a clear vault of indigo sky overhead, with the west banked full of rolling cumulus clouds, which gave all the effect of an approaching storm, but without the threat.

The rims of the hanging glaciers high up on the mountains to left and right were scintillant with reflected sunlight. On all sides the broken surface of the ice field threw tremulous shadows, like those of the waves of a choppy sea (see page 417).

The pictorial possibilities of the traverse so smote upon the artistic spirit of Harmon as to leave him for the moment gasping like a child set down in a candy shop and told to help himself.

THE PACK TRAIN WORKS DOWN THE GLACIER

Winding and twisting, doubling and turning, La Casse slowly worked the pack train out toward the great medial moraine stretching down the middle of the glacier.

Yawning cracks, opening beyond eyescope into the blue-green depths of the ice, repeatedly turned us back; but there was none long enough to block the way completely. Such chances as there were of breaking through, La Casse took by going ahead.

Indescribably rough and slippery, the surface of the ice proved unexpectedly firm underfoot. A horse had its tail or neck sharply stretched now and then, as its mate immediately astern or ahead went down and wallowed at the end of the binding halters. The casualties to packs, however, were less than when working through the mud or in the timber.

The abysmal groans of cracking ice were nerve-wracking to the novice at first, but one steadied to them in time, when they failed to make good their threats of opening up the glacier under one's very feet.

THE HORSES SLIDE TO SAFETY

Doing two or three miles of windings for every one of progress toward the foot of the glacier, the hours slipped swiftly by. We were still a mile from the point where the end of the ice wall broke down to the flats of the Saskatchewan, when a deepening and widening of the crevasses ahead warned us to get the pack train off on to the rocky mountain side to the north.

The only place where it appeared this could be accomplished successfully was a narrow tongue of ice and gravel, running down to the native rock, between two very deep crevasses. The "runway," with the ice breaking sharply away on either side, was about 20 feet wide; the distance down to the rock perhaps 80.

With the slope far too smooth and steep to provide hoofhold, the only really safe way of getting down would have been to unpack the horses, throw them, tie their feet, and lower them on their sides by ropes. An animal was bound to go down somehow, of course, once he was started. The danger was that, floundering in his fright, he might get into one of the crevasses.

Lacking time to resort to the safety-first method, we turned to the only other alternative. This consisted of leading each horse to the edge, starting him

Photograph by Byron Harmon

STRUGGLING UP JONAS CREEK VALLEY A THOUSAND FEET ABOVE TIMBER LINE

For ten days the Columbia Ice Field party did not see the bare earth, except for wind-swept peaks and small patches under thick trees.

down, headfirst, by a rope pulled from below, and trusting to his instinct to keep his center of gravity low by sitting on his haunches and sliding, rather than floundering to a footing.

This succeeded even beyond our hopes. Though all the horses did not have the sense to slide, the three or four that invited rolling by trying to gain their feet kept on going in a straight line, reaching the bottom unhurt.

With a faint trail streaking the rocky mountain wall where the pack train of the previous year's traverse had picked its way, it now seemed that the worst was over. Another hour at the outside would, we thought, bring us to a camp in the flats below the snout.

We took our time in relashing packs for the rough clamber down along the side of the glacier. The mauve shadows of coming night were piling thick in the ice-filled valley by the time we were ready to push on.

A quarter mile of increasingly difficult going brought the head of the pack train to a point where a breaking away of the mountain side above had choked the route with a slide of broken rock, extending as far ahead as one could see. It seemed so impossible to cross, that we turned to the glacier again, in the hope that the ice could be followed at least far enough to get below the rocky barrier.

A way to the glacier over an easy-sloping drift of old snow lent momentary encouragement. But our disappointment was keen when we found ourselves on a patch of ice, hardly 100 yards in diameter, completely encircled by a connecting series of impassable crevasses.

THE PACK TRAIN PUSHES THROUGH A SLIDE OF TILTED ROCK

There was nothing to do but return and try to pass the great rock slide.

The problem was a dual one. The huge, sharp-edged fragments were so set that sliding hoofs went down between them at every other step, and many were poised in so delicate a balance that the least touch was likely to send them bounding down, to start a slide that nothing but the side of the glacier could stop.

I would have been reluctant to venture here on foot; with a pack train it seemed like courting certain disaster.

For an anxious interval at the outset it looked as if calamity were coming to meet us, even before we had made a real start. We were working the animals, one at a time, out on to what seemed the least-threatening line of passage across the broken rock when suddenly the horse carrying the radio tried to find a way of his own, and stepped between two tilted chunks, each larger than himself.

Instantly both closed down upon him, smothering his frantic flounderings in the grip of a vise of stone. It looked like broken legs and crushed ribs, a case beyond all treatment save that of the revolver.

Baptie and La Casse started at once to work away the inclosing rocks. The rest of us stood by to prevent a stampede of the other horses.

Buster and Tip, who had been chasing rock rabbits farther up the slide, charged down, doglike, for the center of disturbance. The flying feet of each started rocks rolling almost simultaneously. Buster scored the first hit when the solid little hunk he had spurned smote Baptie's mount and knocked it sprawling.

RESCUING A HORSE FROM A VISE OF ROCKS

Tip's salvo, with a ton more weight behind the main unit of it, found nothing but the back of my knees to mar the curve of its trajectory. Flicking my legs up into the air, it passed on to crash against the glacier wall, leaving me sitting upright in its cometlike wake of débris.

A missile heavy enough to have shattered a leg of the Colossus of Rhodes had brushed my relaxed anatomy aside, without inflicting more than a few very light bruises.

It took a deal of lifting, hauling, and prying to dislodge the rocks from the imprisoned horse without starting another slide. We had the agreeable surprise, however, of finding the animal practically uninjured, beyond much abrasion of hide.

The stout cedar pack-box containing the radio outfit had taken most of the crushing on one side, while a grub-box had absorbed it on the other.

Our progress across that slide of tilted rocks was glacial in slowness, punishing in severity (see page 402). Horses were down repeatedly, usually with the loss of

Photograph by Lewis R. Freeman

DESCENDING FROM JONAS PASS TO UPPER JONAS CREEK

The hardest traveling on the return trip was experienced in climbing the divide between Poboktan and Jonas creeks.

a pack that had to be rethrown while the whole train waited and fretted.

But foot by foot we worried along, for the first and last time in comparative vocal silence. Even voluble old Soapy bethought himself to choke back the explosive oath that might have set the cumulative air-wave wriggling, to start another hair-balanced rock on the slide above.

Finally we won through to solid footing—a sloping cliff of torn and riven bedrock left exposed by the melting of the glacier. It slanted downward like the roof of a Gothic steeple, while its rough surface tore the unshod hoofs like a rasp.

But there were no more rock slabs to slip between, no more balanced boulders to dislodge.

We hurried to make the most of the dying daylight, and tongues and reatas were unleashed in unison to push on the scurrying, stumbling mob. Fantastic cowboy oaths clove the air like the spatter of shrapnel, and the blended sobbing of winded horses rose in a whistling croon.

A MOOSE STALKS THROUGH AN EXHAUSTED CAMP

Over a half mile of rock, wet with blood from hoofs worn to the quick, we clattered down to the packed white gravel of the flats below the jutting ice-snout. The reflection of the last of the after-

Photograph by Byron Harmon

BREAKING TRAIL THROUGH FIVE FEET OF SNOW ON THE UPPER POBOKTAN

glow was fading from rose pink to cinnamon and dusky olive on the summit of Saskatchewan.

Packs were thrown off at the edge of the timber. Too tired to cut tepee and tent poles in the dark, we rolled to blankets and sleeping bags as soon as a greedily wolfed supper was over. No one but the dogs could have told at what time the big bull moose, whose tracks we found in the morning, stalked straight through the camp on his way to water.

As Soapy was anxious to work the soreness out of the horses by action rather than let them grow stiff in a region where the grass was so poor, we broke camp early next morning and started on the hard, steep climb over the shoulder of Athabaska to the north. The pack train attained the summit of the ridge and began the descent to Nigel Creek at an elevation of about 8,000 feet.

Harmon and I climbed 1,000 feet higher to take a panorama of the surrounding mountains. From a lofty vantage previously utilized by the Boundary Survey, we had a fine view of the remarkable ridge of rock thrown completely across the valley of the North Fork, forming a natural bridge which has never been satisfactorily photographed.

Following the pack train to the valley on the north, we crossed the almost imperceptible divide of Sunwapta Pass, separating the drainage to the Arctic and to the Atlantic, and found camp pitched four miles farther down, almost under the snout of the great Athabaska Glacier.

Here we spent four days, resting the horses, climbing over and photographing the glacier, which vies with that of Saskatchewan for the distinction of being the largest ice tentacle of the great mother glacier.

In spite of violent snowstorms coming up the valley from the Arctic, the radio, still in commission after the terrible banging it had received while crossing the glacier, brought in programs from all parts of Canada and the United States. We were troubled practically not at all with "fade-out," being able to hold the programs of the stronger stations from end to end when desired.

At this camp we first began to take notice of the Pacific coast weather forecasts, broadcast by the powerful KGO station of Oakland. These subsequently

became useful in planning for photographic work and trail movements of a character to be affected by the approach of a storm from the Pacific northwest.

The next point on the Columbia Ice Field which we planned to reach was the head of the Athabaska, immediately under the great peaks of Alberta — the Twins, King Edward, and Columbia. As the crow flies, the distance was not great, but by the only possible route with pack train it was close to 80 miles of flooded valleys.

Because the canyon of the Sunwapta, which heads at the Athabaska Glacier, was impassable for horses, we had to begin the long and circuitous journey by climbing over the lofty Wilcox Pass to the east (see page 427).

We came back to the flats of the Sunwapta below the canyon and encountered a sea of glacial mud far worse than those previously experienced on the Bow, Mistaya and Saskatchewan. Following one serious miring, the whole pack train floundered over the muddy bank into the river, soaking both food and photographic supplies badly. Camp had to be pitched immediately to effect salvage operations.

We left the Sunwapta at the strikingly beautiful falls of the same name, crossed a low divide to the Athabaska, and began the long, tiring pull to its glacial source. There was much hard work in fallen timber, through which we had to push when the valley became too deeply flooded, but nothing comparable for trouble to the mud flats of the middle Sunwapta.

The river was crossed often in its upper reaches, but, with swift water flowing over gravel bottoms, we were compelled to swim the horses only once or twice.

At the end of six days from the head of the Sunwapta we had reached our objective. Camp was pitched under the lee of a timbered island three miles below the base of Columbia peak and glacier and literally at "last grass."

COLUMBIA PEAK IS THE MOST BEAUTIFUL OF THE NORTH AMERICAN ROCKIES

Then followed eight days of futile waiting—an interval in some ways more trying than the worst spells of travel in mud and water. We were vouchsafed one unforgettable view of the slender pinnacle of its summit, suffused in the gold-pink glow of the sun that set on the day of our arrival. Then the most beautiful peak of the whole North American Rockies system settled down to the provocative tactics that had made it a mountain of mystery since the day of its discovery.

One day it was a chaste madonna, raising an adoring face behind a dusky veil that barely revealed a misty outline of its form. Another time it was a dancer, lifting a tantalizing skirt to show dimpling knees twinkling in the froth of billowing chiffon, or poking a coquettishly bared shoulder from behind a masking screen.

This was good "movie stuff," but it was the classic "altogether" that we wanted for the permanent record of the stills.

A FOUR-DAY BLIZZARD SWEEPS DOWN UPON THE CAMP

The half-famished horses were munching willow bark and leaves in place of the grass already gnawed to the roots. Our own salt, sugar, and canned goods were gone, and only a much-reduced ration of bacon, flour, and oatmeal remained. Still we hung on, waiting for our perverse minx of the mountain to exhaust her whimseys and, as Soapy put it, "give us an honest-to-goodness look-see."

As a reward for our patience, what should she do but take the veil completely. With a four-day blizzard from the north reducing the width of our world to a bare 50 feet from the tepee door, we went on waiting, cheered by the wonders of lighting that we told ourselves *had* to come when the proverbial sunshine followed the storm.

But when on the fifth day—the eighth from that of our arrival—the sunshine, passing by the still veiled mountain peak, came only to flood the snowy valley, we gave up the fight and, dejected and beaten, prepared to depart.

With the gaunt, hollow-eyed horses barely able to totter under the depleted loads, the pack train set off down the valley at noon of September 25. The sky was overcast, but Harmon and I, with our saddle animals and the horse packing the cameras, remained behind on the off-chance of an altogether improbable clear-up. Pushing up the valley leisurely

Photograph by Byron Harmon

NEARING THE DIVIDE BETWEEN THE BRAZEAU AND THE CLINE RIVERS

to a sheltered point two miles from the base of the mountain, we ate our lunch and waited for something to happen.

COLUMBIA PEAK DROPS ITS VEIL AT LAST

At 3:30, with a gray barrier of mist still masking the mountains to the southward, it looked as if our only diversion would come from a belligerent bull caribou, who began a series of short, broken rushes in our direction by way of demonstrating his prowess before a small herd of palpably admiring cows.

Then, suddenly and without warning, the veiling clouds fell away like a parted curtain. Mistress Columbia, garbed in a clinging mantle of new-fallen snow, radiant in the calciumlike glow of the low but brilliant afternoon sun, stood bowing, "At your service!" (see page 419).

Both light and setting were beyond anything we had dared hope for—sparkling side-shafts of sunshine, with just enough cloud for background and shadow.

The view lasted for 40 minutes, ever changing but ever beautiful, and in that time we exposed still negatives at the rate of one a minute, besides running 400 feet of movie film. The black rectangles of paper torn from Harmon's film packs were piled up behind his tripods like the brass shells around a hard-pumped machine-gun at the end of a battle.

And a battle this had been, in a sense—one in which, after tasting all the bitterness of defeat, we had snatched a golden victory at the last moment. That, as I think of it now, was the high moment of the trip.

The sooty pall of nimbus, which rolled down from the north to snuff out the radiance streaming over Columbia, pelted us with a spatter of snowflakes. When we had packed the cameras, we rode out of the timber 15 minutes later into the teeth of a baby blizzard.

A TRIP TO HISTORIC FORTRESS LAKE

Fortunately, with heavy mittens, fur caps, and parkas, we were prepared for such an onslaught and we did not have to seek shelter. The horses were a bit at sea until they struck the trail of their mates; then they bent their heads to the gale and plugged doggedly down the valley. With the river at a low stage from the cold, the fords were easy.

The storm ceased just before dark.

Photograph by Byron Harmon

NEAR THE SUMMIT OF WHITERABBIT PASS

On the return journey from Jasper to Banff the photographing party made a wide swing to the east in order to follow the course of the Cline River as far as Whiterabbit Creek, up which the route led over the divide separating it from Ram River (see opposite page).

Photograph by Byron Harmon

IN THE SNOWS OF RAM RIVER

On one of the three days spent in camp at the mouth of the Chaba, to give the horses a chance to graze and recover strength, we made a hurried side trip to historic Fortress Lake. This lovely body of water, which drains both ways from its seat on the Continental Divide, was known to the Hudson's Bay voyageurs and frequently trapped in later years. In the present century it has probably not averaged the visit of an outfit a year.

The timber on the British Columbia side was finer than any other we had seen in the Rockies.

Leaving the mouth of the Chaba on September 29 with light packs, we reached Jasper on the afternoon of October 1. The Athabaska was followed fairly closely all the way, the last two days over a well-cut-out trail. Below the mouth of the Whirlpool, we were on the old transcontinental path of the Hudson's Bay traders.

Some of the cuttings we examined may well have been stumps from one of the very earliest clearings. They looked fully as old as some rotting stumps of great size—doubtless left by the same axes—which had thrilled me in passing the site of Boat Encampment, at the apex of the Big Bend of the Columbia, four years previously.

The successful photographs of Mount Columbia and the head of the Athabaska River completed the picture program as originally laid out. The return with the pack train to Banff was now the main problem.

With the winter's snows already lying deep in the higher valleys and passes, no time was lost in Jasper. We attended to shipping exposed film, reprovisioned, and obtained heavier winter clothes the morning following our arrival, and we were free to take the road again the same afternoon.

Camping three days for pictures at lovely Maligne Lake, we pushed on the morning of October 7, to find heavy snow as soon as we began the ascent to the pass above.

FIGHTING THROUGH SNOW IN 10-BELOW WEATHER

For the next ten days, save for wind-swept peaks and small patches under thick trees, we never saw the bare earth. In the lower valleys snow was from six inches to two feet in depth; on the passes and in drifted ravines we broke our way through from four to six feet. Our hardest fights were over the divide between Poboktan and Jonas creeks, and at the pass between the Brazeau and the Cline.

It was 10 below zero the night before we tackled the former. We had to sleep on boughs without overhead shelter, due to the fact that there were no tepee or tent poles at our timber-line camp. With the horses weak from difficult forage conditions, we were near to failure at both passes, but were fortunate enough finally to win through.

Once down to the Saskatchewan at the mouth of the Cline, we had a well-traveled trail all the way south. More important still, the route led by valleys famous for the finest grazing in all the Rockies. Our most serious worries were over.

With the horses picking up weight and strength all the way, we cantered into Banff on October 24, ten weeks after our departure from Lake Louise. Not one horse had been lost; not one had been permanently lamed, in the whole course of what was probably the roughest continuous pack-train journey made in the Rockies in recent years.

It was a notable achievement for our packers.

Notice of change of address of your GEOGRAPHIC MAGAZINE *should be received in the office of the National Geographic Society by the first of the month to affect the following month's issue. For instance, if you desire the address changed for your June number, the Society should be notified of your new address not later than May first.*

THE LAND OF THE YELLOW LAMA

National Geographic Society Explorer Visits the Strange Kingdom of Muli, Beyond the Likiang Snow Range of Yünnan Province, China

By Joseph F. Rock

Leader of the National Geographic Society's Yünnan Province Expedition, Author of "Banishing the Devil of Disease Among the Nashi," and "Hunting the Chaulmoogra Tree," in the National Geographic Magazine

With Illustrations from Photographs by the Author

When the National Geographic Society's Expedition into Yünnan Province, China, had completed its work extending over a period of two years, I decided to make a dash to Muli and pay a visit to the ruler of that lonely mountain stronghold.

One of the least-known spots in the world is this independent lama kingdom of Muli, or Mili, in the extreme southwest of the Chinese Province of Szechwan (see map, page 450).

Almost nothing has been written about the kingdom and its people, who are known to the Chinese as Hsifan, or Western Barbarians. The Europeans who have passed through during the last 100 years can be counted on the fingers of one hand.

Two years before, I had sent Nashi plant collectors to Muli with a letter to the lama king, announcing my probable arrival within a few weeks. The king, who never leaves his domain, sent me a polite reply, necessitating an 11-day journey by special runner, and asked me not to come. Brigands were too numerous in his district, he said, and it would be impossible for him to give me proper protection.

He stated also that the unruly Tibetan tribe known as the Hsiangcheng, inhabiting the territory of the upper reaches of the Yangtze, came periodically to Muli to rob and plunder. The Hsiangcheng drove off his people's herds of yak, sheep, and horses grazing on the alpine meadows and left his subjects in distress and utter poverty.

I respected the king's wishes and did not visit him at that time, but in January, 1924, just about one month before Chinese New Year, I decided to make my deferred visit before taking the long journey out into the civilized world.

The National Geographic Society's Expedition headquarters were in the Nashi, or Moso, tribal village of Ngulukö, in the district of Likiang, on the slopes of the great Likiang snow range,* which extends from north to south and has three mighty peaks, two of which are 20,000 feet in height.

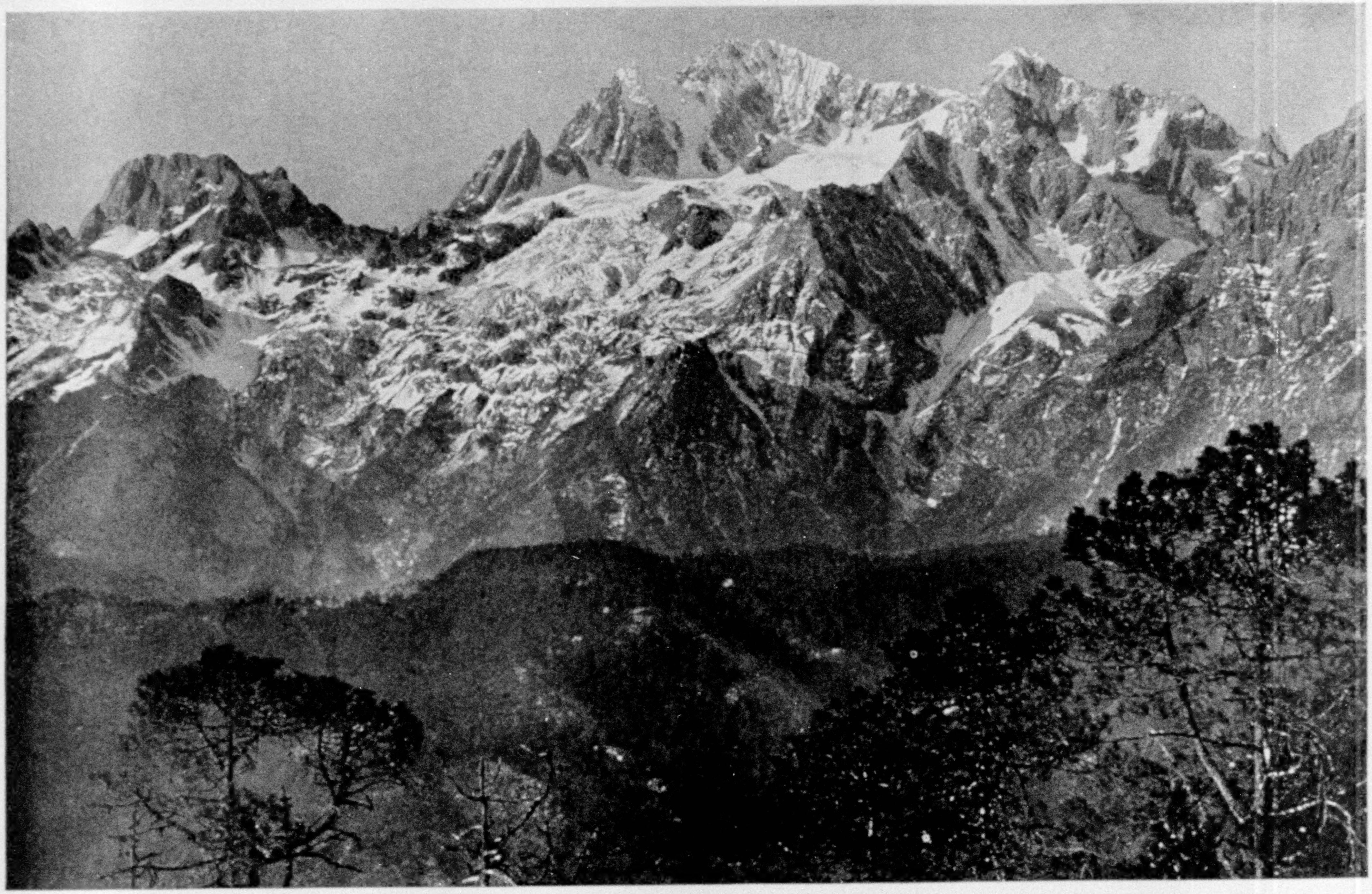
THE ROAD TO MULI LIES THROUGH GORGES AND OVER MOUNTAINS

These mountains are pierced by the mighty Yangtze, which has cut a trench 13,000 feet deep through a wall of limestone rock crowned with eternal snow, and also makes a great loop which adds several hundred miles to its course. The whole region is a vast conglomeration of peaks and mighty gorges, with very little level ground. The trip from Likiang to Muli, therefore, is one of the most trying in southwestern China.

In 1921 I had come overland from Bangkok, Siam. I passed through the entire length of that kingdom; thence through the southeastern Shan State of Keng Tung and the whole length of the Province of Yünnan; but nowhere were such difficult trails encountered as those down to and across the Yangtze gorges and over the Likiang mountain ranges to Muli. It takes a hardened constitution and great powers of endurance to make the trip.

I sent my card to the Chinese magistrate of Likiang to announce my start for

* See "Banishing the Devil of Disease Among the Nashi," by Joseph F. Rock, in the National Geographic Magazine for November, 1924.

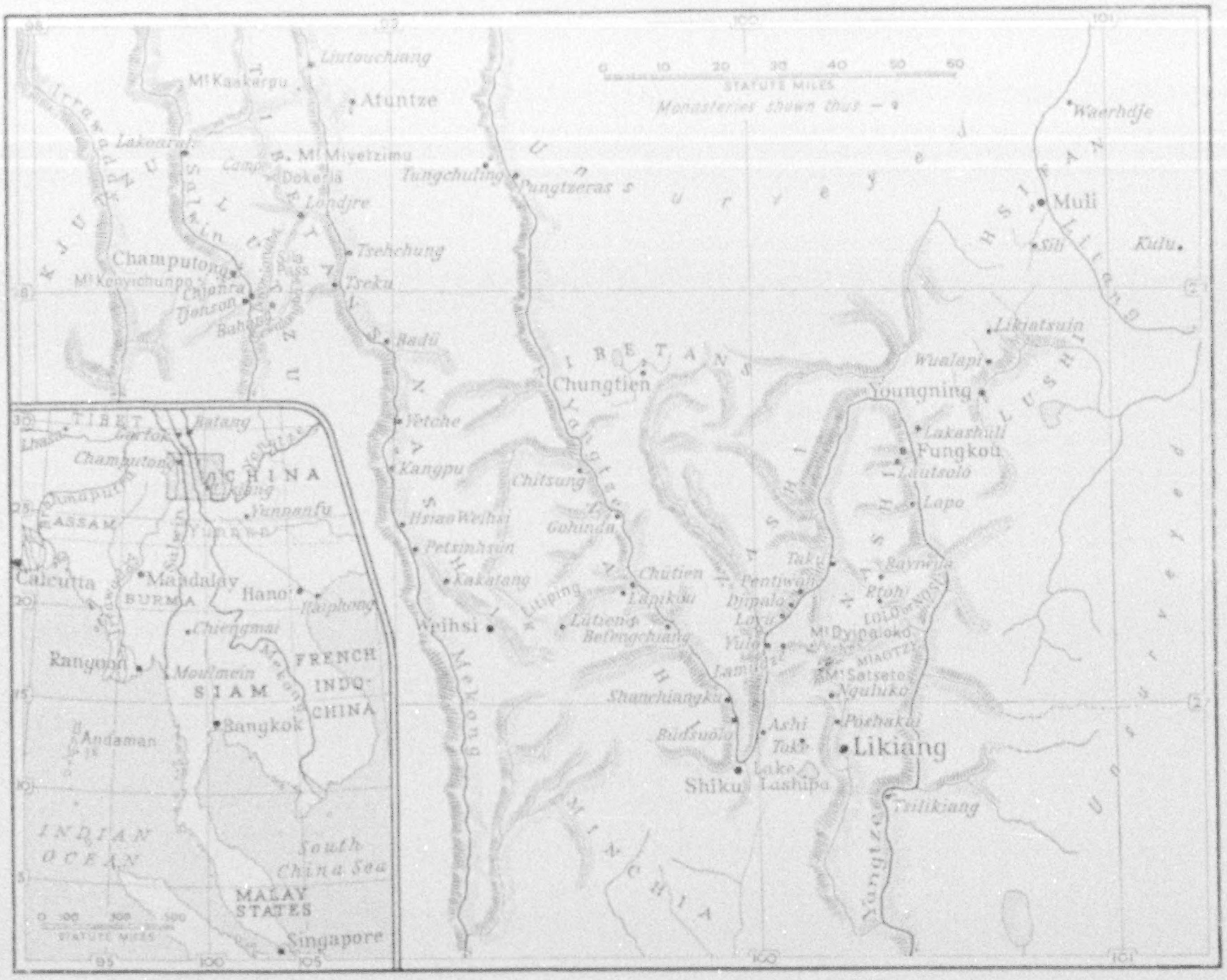


MOUNT SATSETO OF THE LIKIANG SNOW RANGE

In the extreme right of the picture is Mount Dyinaloko, the northern peak of the snow range, about 20,000 feet in height (see map, page 450). This photograph was made at an elevation of 12 000 feet. The trees in the foreground are *Pinus sinensis yünnanensis* and *Quercus semecarpifolia*.

LOLO (NOSU) WOMEN OF THE PINE FOREST REGION NORTH OF THE LIKIANG PLAIN

The houses of these primitive people are of rough pine boards, tied together with cane, and the roofs are weighted down with rocks. The women wear a peculiar headdress of black cotton cloth.



Drawn by Chas. E. Riddiford

MAP SHOWING THE YÜNNAN PROVINCE TERRITORY, WHERE A NATIONAL GEOGRAPHIC SOCIETY EXPEDITION WAS AT WORK FOR TWO YEARS

The leader of the expedition, Mr. Rock, made his headquarters at Ngulukö, north of Likiang. In the accompanying article he describes his trip to the little-known lama kingdom of Muli (near the upper right corner of the map). The route followed a trail from Ngulukö northward, across the Peshwe; through mountains inhabited by the Lolo, or Nosu, to Bayiwua; up the Yangtze to Lapo, Lautsolo, and Fungkou; across the river by ferry; thence to Youngning, Wualapi, Likiatsuin, and Sili to Muli. The shaded square of the inset map shows the area covered by the expedition.

Youngning, capital of the Lüshi tribe, on the border of Yünnan and Szechwan. I was careful not to mention Muli, else he would have blocked my way. I requested, as is customary and even obligatory in Yünnan, the necessary military escort for the journey.

WARNED AGAINST BANDITS

The magistrate politely sent his card, beseeching me to abstain from traveling at that time of the year, for it was near to the Chinese New Year, when robbery increases a thousandfold and all roads are practically closed to traffic.

The reason for this situation is that every Chinese, and such tribespeople as have adopted Chinese customs, must pay their debts on Chinese New Year, no matter where or how they get the money. Many debtors, who find themselves without means wherewith to pay their obligations, turn brigands to save their reputation and to enhance the possibility of borrowing again soon after Chinese New Year. Few people will venture out on trails or roads at that particular time.

When I persisted in my determination, the magistrate sent word that, under the circumstances, he could not furnish me with an escort. I sent my card again, with the brief remark that I would start the next day at 6 a. m. He made no reply this time, but in the evening there appeared at my village ten Nashi soldiers

fully armed with Austrian guns of the vintage of 1857.

These weapons were muzzle-loaders and in woeful condition. Some were tied with string and others were nailed together to keep them from falling apart.

A few of the soldiers were boys of 14 or 15 years of age, whose bosoms swelled with the importance of their office. To them it meant harassing the people. One is obliged to pay these soldiers, and often they give more trouble than actual help. They settle on a village like flies on a pie, and rarely pay for what they eat, but bully the farmers if the best is not forthcoming. They usually help themselves to what they want, and none dare say them nay.

Much to their disgust, I made it a point, as long as any soldiers were with me, to make them pay for everything they took or ate.

Before our departure the men were lined up and given their instructions. Six soldiers were to go with me and four with the caravan, which consisted of eleven mules and three riding horses.

The region we were about to traverse is sparsely settled and so mountainous that hamlets are perched on cliffs like swallows' nests against a wall. Hence we had to take sufficient provisions for at least a month, both for myself and the ten Nashi guards. Even horse beans had to be carried for my riding horses, as little forage could be obtained beyond Likiang.

THE MULI REGION IS A TRIBAL LAND OF BABEL

No Chinese are encountered on the whole trip of 10 or 11 days to Muli. The land is inhabited by Nashi, Lolo, Lüshi, and Hsifan. Each tribe speaks a distinct language and, what is still more curious, has besides its own name several others which are given it by its various tribal neighbors. This is a land of Babel.

The region of Likiang, once the capital of the powerful and warlike Nashi kingdom, is now inhabited by tribespeople who have come in contact with the Chinese, and who are therefore somewhat more civilized than their kinsmen living in the hinterland, deep in the great Yangtze loop. The latter seldom meet travelers of any kind, and only on rare occasions visit Likiang, a conglomeration of mud huts and a market place, which is to them a metropolis of marvelous splendor. News is exchanged by word of mouth, for no such thing exists as a newspaper.

THE START FOR MULI IN MIDWINTER

We left Ngulukö (see map, page 450) on a cold winter morning. The wind was howling furiously and huge masses of dry snow were being whirled hundreds of feet into the air from the peak of Satseto. The northern end of the Likiang plain, in summer a veritable flower garden, was dry, brown and wind-swept, studded here and there with evergreen oak scrubs and gnarled pines.

The gale from the southwest fairly pushed us along and almost off our horses.

The trail is poor, and one has to pick a way over limestone rock as sharp as a knife blade.

After crossing a pine-clad spur, we followed what appeared to be a volcanic rift or fault which extends the entire length of the eastern end of the Likiang plain. Then we descended to a magnificent meadow, or rather basin, hemmed in on the west by the wonderful snow range, with its glaciers and forests of larch, spruce, hemlock, fir, and pine, and on the east by a gently sloping wooded mountain range with hanging alpine meadows.

No wind disturbed this haven, and although it was the middle of January, blue primroses peeped above the ground, as if to say, "Let us be the first to enjoy this lovely scenery ere lightning flashes and rolling thunder announce the coming of a rainy summer."

Two mighty gashes carved by ice appear in the rock wall of the snow range. They mark the headwaters of the glacier-fed Peshwe and Heshwe, the white and black streams which, a few miles beyond, unite to mingle their waters with those of the great Yangtze.

Here groups of Nashi were busy felling trees and hauling them on pairs of solid wooden wheels across the plain, over rock and brush, to distant Likiang. The foresters were unkempt and forlorn-looking, with long hair often braided into pigtails.

Ahead of us we saw a mountain some 15,000 feet in height. To our left was

THE NASHI MILITARY ESCORT AND LAY ASSISTANTS OF THE AUTHOR

The expedition passed through this dense forest of Yünnan hemlock (*Tsuga yünnanensis*) en route to the Yangtze north of Bayiwua, at an elevation of 11,000 feet (see page 455).

the glorious range which, in all its splendor, reaches northward with its turrets, castles, and deep chasms. On beholding it, no one would dream that the waters of the Yangtze have triumphed over the mass of rock and cut their way north, only to be turned south again by a lower range.

AN OLD WOMAN OF THE LÜSHI TRIBE WHO DARED TO FACE THE CAMERA

The Lüshi inhabit the region between the Yangtze and the Litang rivers. The author's interpreter found it impossible to converse with these people, for their language is more than a mere dialect of the Likiang Nashi. Note the skirt of the woman in the right background; she is fleeing from the camera.

THE YANGTZE ON THREE SIDES

No person, unless he has studied the map (see page 450), would surmise that he is almost surrounded by the Yangtze.

Here hidden among a maze of peaks and hemmed in by mighty walls, this majestic river later becomes the bearer of prosaic burdens in its lower reaches, through the heart of China.

We entered a grove of spruce and hemlock, then descended over an icy trail to the foamy Peshwe, which danced over rocks and boulders, its banks bordered with giants of the forest and flower-laden rhododendron.

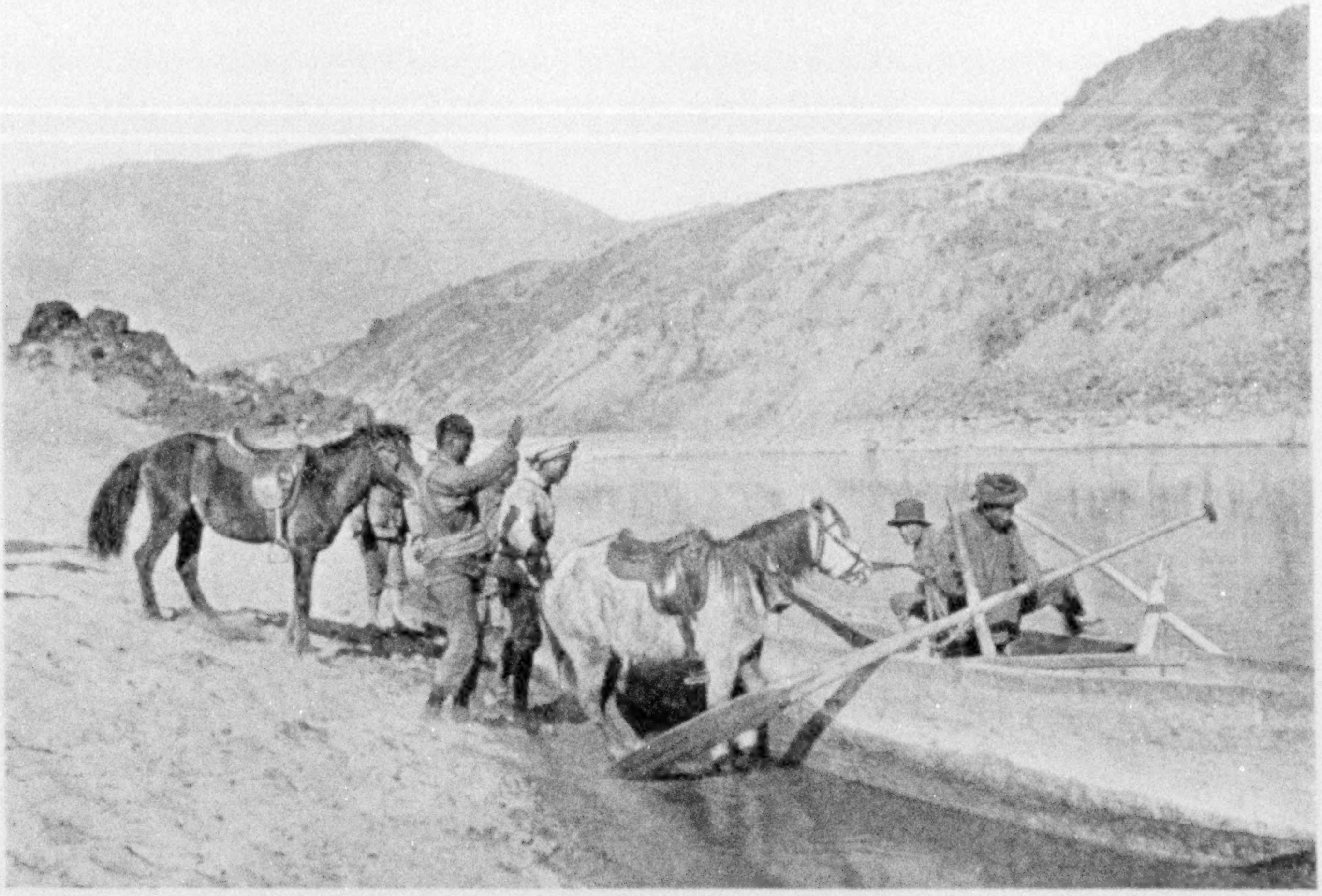
A small stone arch bridge spans this stream near the scene of a bloody battle some months ago, when 1,200 Tibetan brigands came within 20 miles of Likiang. A skirmish took place between Chinese soldiers and Tibetans. The former were nearly annihilated, while only one Tibetan lost his life. His garments, or what was left of them, were still hanging on a bush. Farther on we found an empty coffin in the middle of the trail, left behind by the Chinese, who could not recover all their dead after the skirmish.

As we progressed through forests of oak, fir, spruce, and hemlock, interspersed with rhododendron and canebrake, snow covered the mossy carpet of the sloping hillsides. High above us the brown alpine meadows, bordered by black firs, were crowned by crags and rocky walls culminating in Mount Dyinaloko.

THE PRIMITIVE LOLO ARE FOREST DWELLERS

Amid this grandeur we pitched our tent for the night. The air was bitter cold and the soldiers sat around a roaring fire. Shots were fired to let marauders

XUM



THE YANGTZE FERRY BELOW FUNGKOU

The saddle horses of the National Geographic Society's Expedition are being loaded on the leaky ferry, which made ten trips to get the party across (see text, page 458).

know that we meant business in case of attack, and soon all slept peacefully on the first stage of our journey to Muli.

A glorious sunrise awakened us after a restful night. The intense cold at this elevation, some 12,000 feet above the sea, made everyone move quickly, and we soon were on our way through a region inhabited by the primitive Lolo tribespeople who move noiselessly through the weird, somber pine forests which provide boards for their humble dwellings. The logs are roughly hewn and placed on edge in a way that makes windows for ventilation unnecessary. The roofs are of the same material and weighted down with rocks.

The Lolo women wear skirts decorated with old-fashioned flounces, reaching almost to the ground, and short jackets (see page 449). Hats, with broad, flopping brims, resembling the heads of antediluvian ichthyosaurs, usually cover their wild-looking, unkempt heads. Most of the children look miserable, with their distended stomachs and with legs like matches.

The quiet of this uncanny forest, with its ghostlike settlers, left me in a melancholy mood until I reached the Nashi hamlet of Bayiwua, situated on a hillside, with a glorious view of the Likiang snow range, and especially of Mount Dyinaloko, with its battlemented crest.

We stopped for the night in the lovely little temple on the hilltop overlooking this hamlet.

What a panorama! After the sun disappeared, magnificent rays streamed forth above the mountain battlements. The snow range assumed the aspect of an icy dragon floating in mid-air, for the deep valley was filled with smoke-blue mist, and only the peaks and ice fields reflected the silvery light of the full moon.

The Nashi of Bayiwua differ from those of Likiang. They are more primitive, for they live secluded among these endless forested hills and mountains. Their womenfolk are very homely and as shy as deer.

They also dress differently from their sisters of the Likiang plain. They wear a much-pleated, whitish skirt with a col-

THE YANGTZE AT FUNGKOU, LOOKING SOUTH (SEE TEXT, PAGE 458)

ored border, together with a short jacket, and from their ears hang huge rings of copper or silver, according to the wealth of the family. These earrings are so heavy that they are fastened to a string wound round the ear or tied over the hair.

The men wear blue cotton trousers and goatskin jackets, with the hair next to the cotton shirt or blouse. They manufacture nothing, but lead a very primitive existence.

Long before sunrise, I stood on the platform before the temple gate to watch the snow peaks turn from gray to pink. Soon the range was blood-red, while the blue smoke which rose from the houses at our feet lay over the valley like a veil, pierced here and there by the dark tops of the fir trees.

MASTIFFS GUARD NASHI SHEPHERDS' CAVES

We wended our way over hill and meadow through thick forests. To the east was a deep chasm which led into the Yangtze gorge thousands of feet below us. For hours our road led through lovely hemlocks (*Tsuga yünnanensis*), whose trunks reminded me of the pillars of the temple of Karnak (see page 452).

We met a Tibetan caravan from Tachienlu, some 20 days to the northeast of us, and were told that the road was free of brigands, and that we had nothing to fear. This put us all in good spirits.

The third evening our camp site was a small meadow in a somber spruce forest near a little icebound brook. Back of us a limestone wall hundreds of feet in height, pierced by black caverns, invited inspection, and while the boys prepared supper I climbed to the foot of the cliff.

I found the caves inhabited by Nashi shepherds and guarded by mastiffs. The larger caverns sheltered the flocks, while smaller ones, mere shelves in the sheer wall, were occupied by the shepherds. Pine-log gates prevented the sheep from straying. On my approach the shepherds hid themselves and would have fled, had that been possible.

The fourth day we crossed the eastern slopes of Laposhan, a huge mountain mass of limestone peaks and crags. Up and down we climbed over several passes, frozen brooks, and marshy meadows covered with ice and studded with low, blue-

THE LEADER OF THE NATIONAL GEOGRAPHIC SOCIETY'S EXPEDITION, WITH HIS ASSISTANTS, AT THE SUMMIT OF THE YANGTZE-YOUNGNING WATERSHED—ELEVATION, 12,550 FEET

flowered rhododendron. After following a lateral ridge, we had a wonderful view of the deep Yangtze gorge, with its dome-shaped spurs, reminding one of the Grand Canyon of the Colorado. The river was not visible.

We then descended over a dry, rocky, narrow spur covered with scrub oak, rhododendron, and pine. A winding trail led deep down into a mysterious chasm. The sun had set, but we had to continue, as no water could be found anywhere. Finally, in utter darkness, we reached a Nashi hut and a terraced, rocky cornfield on the edge of a precipitous canyon. My tent was pitched in this field.

We had just settled down for the night and I was writing my diary, after a trying day's march, when we were startled by the ferocious growls of leopards moving on our camp. The brook below was narrow and the canyon walls rose steeply. The mules became frightened, and the growls came closer and closer. We began shooting into the inky night to drive the beasts away, but, to our astonishment, the leopards seemed to become infuriated and, instead of fleeing, moved nearer. Big bonfires lighted around our mules finally drove the savage cats off.

After a restless night at our miserable camp, we wound down the rocky chasm to the hamlet of Lautsolö, inhabited by poor Nashi people sadly afflicted with

LÜSHI WOMEN OF YOUNGNING IN TRIBAL COSTUME

The long, supposedly white, pleated skirts reach to the ground and are most uncomfortable for walking. On their heads the women wear strings of amber or, in the absence of amber, yellow-colored wooden spools interspersed with red and black ones. These women are relatives of the chief prince of the Lüshi tribe.

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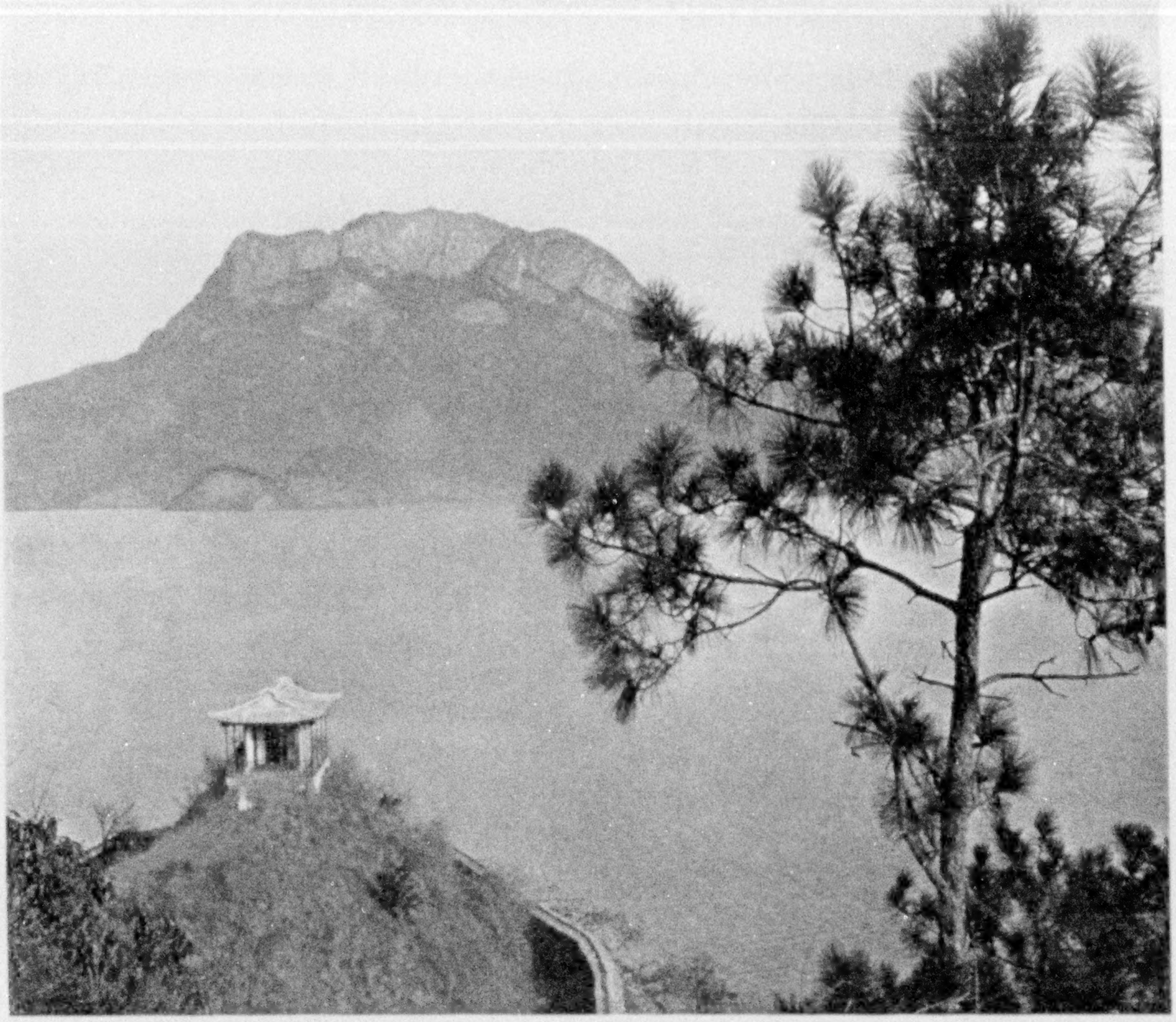


VIEW FROM THE TOP OF THE ISLAND OF NYOROP'HU, IN YOUNGNING LAKE, LOOKING TOWARD LION MOUNTAIN

goiters. Our trail crossed the stream and ascended the other wall. The track was narrow and dangerous. One misstep would have landed us in the yawning chasm.

The scenery in the direction of the Yangtze gorge was magnificent; words cannot describe the grandeur of those sculptured mountains. From the summit of a spur, we beheld a blue ribbon of water thousands of feet below. A narrow canyon opened out into the main Yangtze gorge to our east, culminating in enormous limestone crags. The Yangtze disappeared in a narrow defile to the south.

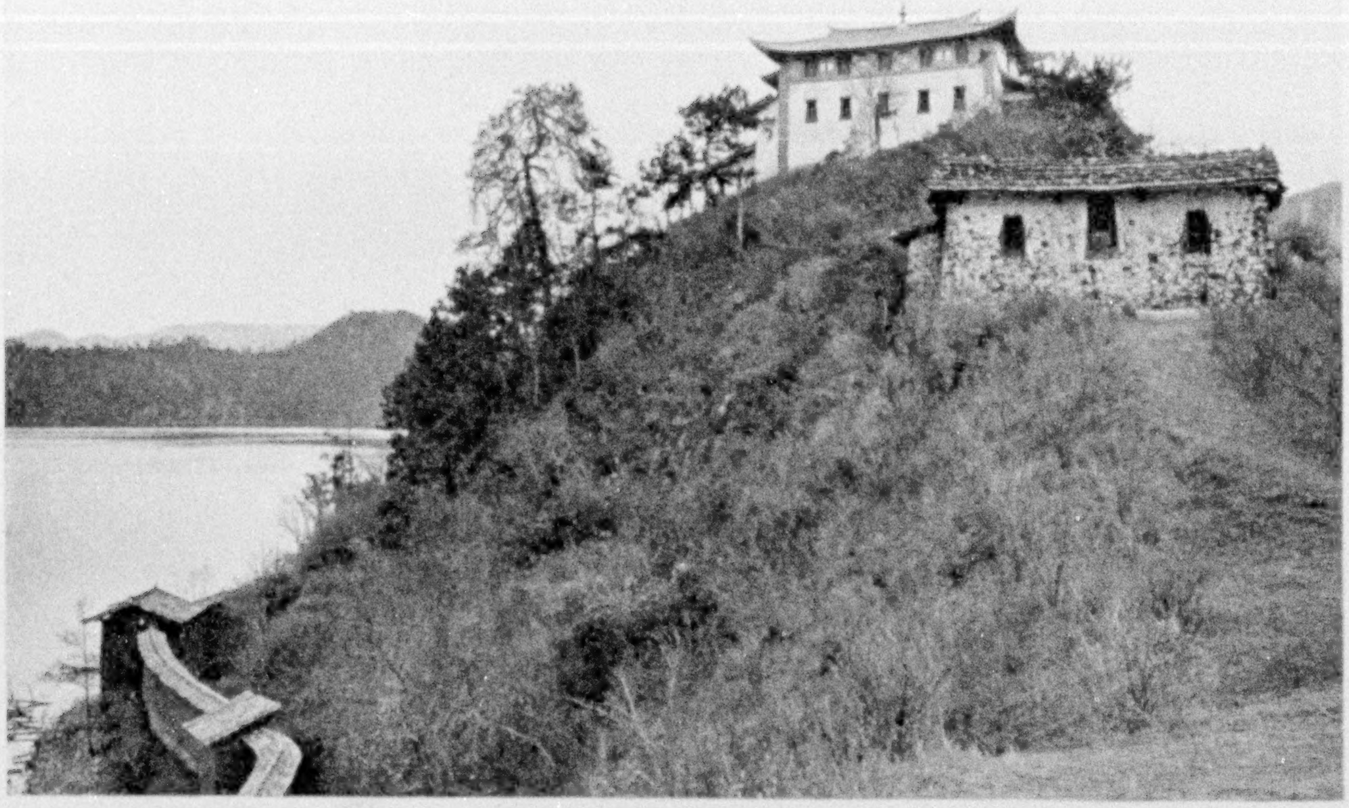
A few hours over a rocky trail brought us to the scattered town of Fungkou and to a public ferry over the Yangtze (see page 454).

As it takes time for a caravan to cross a river, we decided to camp for lunch near the tiny hut of the opium-sodden, though friendly, Nashi who had charge of the ferry. The elevation here is less than 6,000 feet and the heat was intense.

The river at this point is placid, at least in winter, and the current gentle, but in summer it is very dangerous and often impassable.

The view to the south down the haze-filled gorge was awe-inspiring. From here to Lapo the Yangtze is unknown, for no white man's foot has ever trodden its rocky and cliff-bound banks. I was informed that only a very narrow foot-path skirts the arid rock walls of those gorges, and that the heat is stifling in the canyon.

After much shouting and pushing, mules and packs were finally set across the Yangtze. The transfer necessitated ten trips of the leaky boat. Soon the animals were resaddled, and on we went



A TIBETAN SHRINE ON NYOROP'HU IN LAKE YOUNGNING (SEE ALSO PAGE 458)

The island is surrounded by a mud wall with several watch towers. It is plentifully provisioned. The house was built mainly as a place of refuge in case Youngning should be attacked by brigands or by the hostile neighboring Lolo. The National Geographic Society's party spent a pleasant day on the islet.

over grassy hillsides past an imposing lama structure, the repository of native offerings.

We were now in the semi-independent country of the Lüshi, a branch of the Nashi tribe.

A NASHI APOLOGIZES TO HIS GODS

A mighty mountain range and deep chasms still lay between us and the Youngning plain. We stopped for the night at a hamlet, where I took possession of a private shrine in a Nashi house, and, as is always necessary, had the place given a thorough cleaning. That done, I went for a walk while awaiting my belated caravan.

In the meantime the owner of the house, as if to apologize to the gods for the intrusion of the foreigner, filled the room with a nauseating incense. The offering was accompanied with beating of drum and gong. As there were no windows, there was no way of ridding the room of the sickening smoke. I was forced to camp in the open, with the sky as my roof. The full moon shone so brightly that it was difficult to sleep.

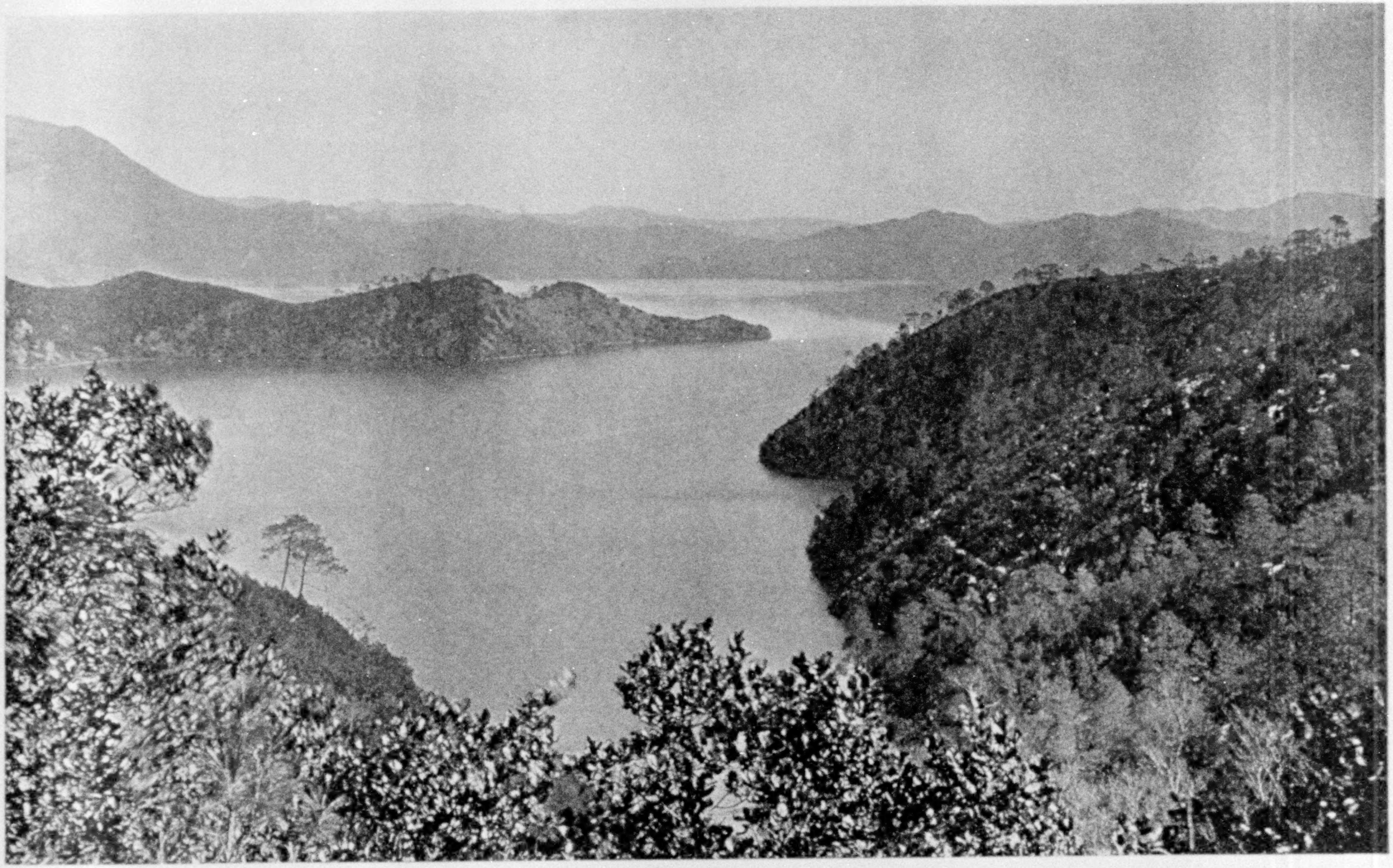
The climb out of the Yangtze gorge proved as difficult as the descent. To our right wound a trail long spurned as unnegotiable, for summer torrents had converted it into a rocky stream bed. Following it we wandered in great zigzags, up, up, up.

In the clearness of the autumn air, the scenery at our feet must have been superb, but the winter haze hid much from view, although it increased the mystery of the deep gorge.

After a wearisome day on the trail, we reached an ideal camping ground, cool and pleasant, for we were now 10,000 feet above the sea.

One more steep climb over the last great range separating the Youngning plain from the Yangtze gorge would take us to the capital of the Lüshi.

A glorious morning, perfumed with the odor of balsam fir and spruce, found us on our way through limestone ravines with icebound brooks.

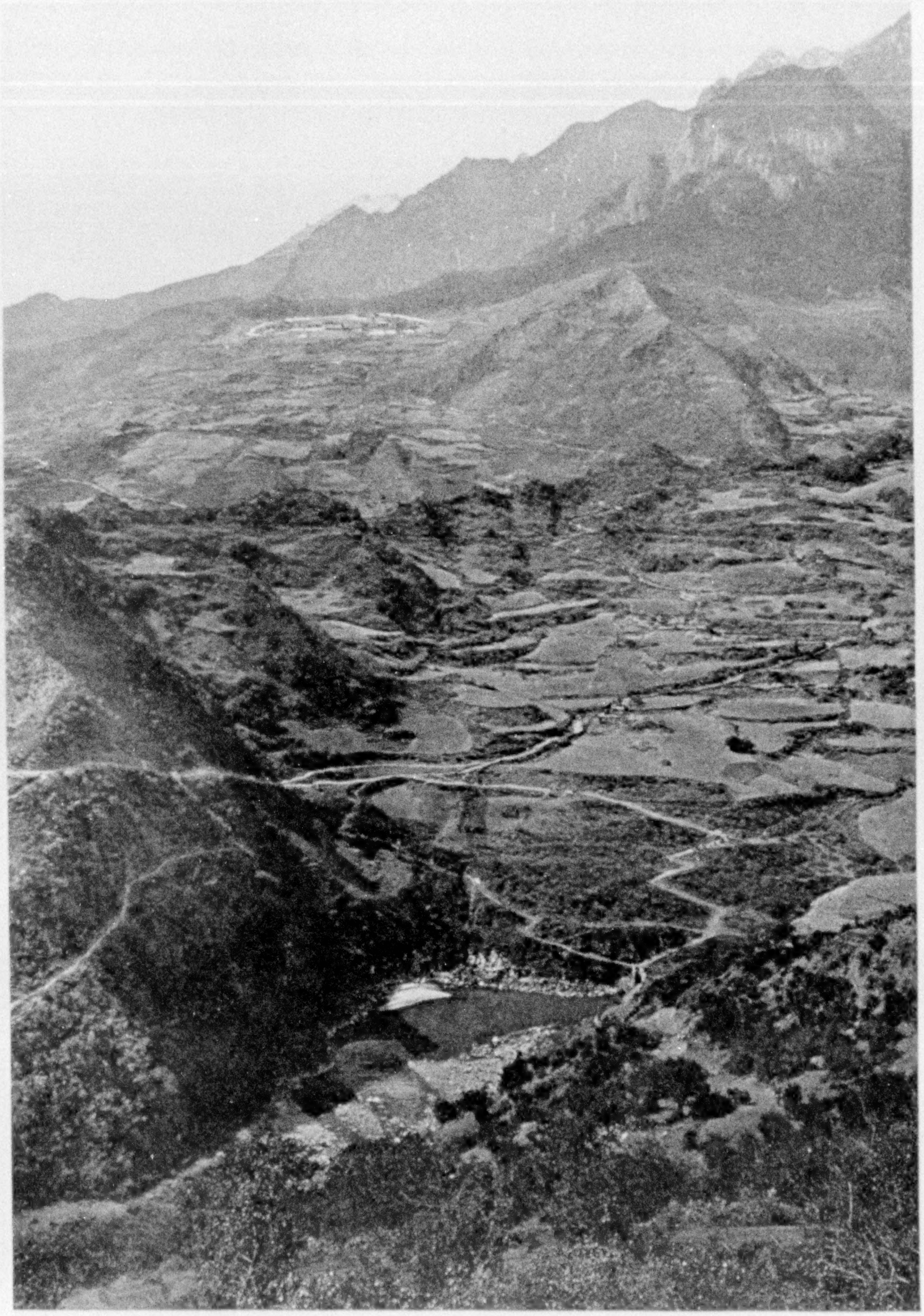


THE BEAUTIFUL LAKE OF YOUNGNING

Half of the lake is in Yünnan, the other half in Szechwan. The vegetation on the surrounding hills is mainly *Pinus sinensis yünnanensis* and *Quercus semecarpifolia.*

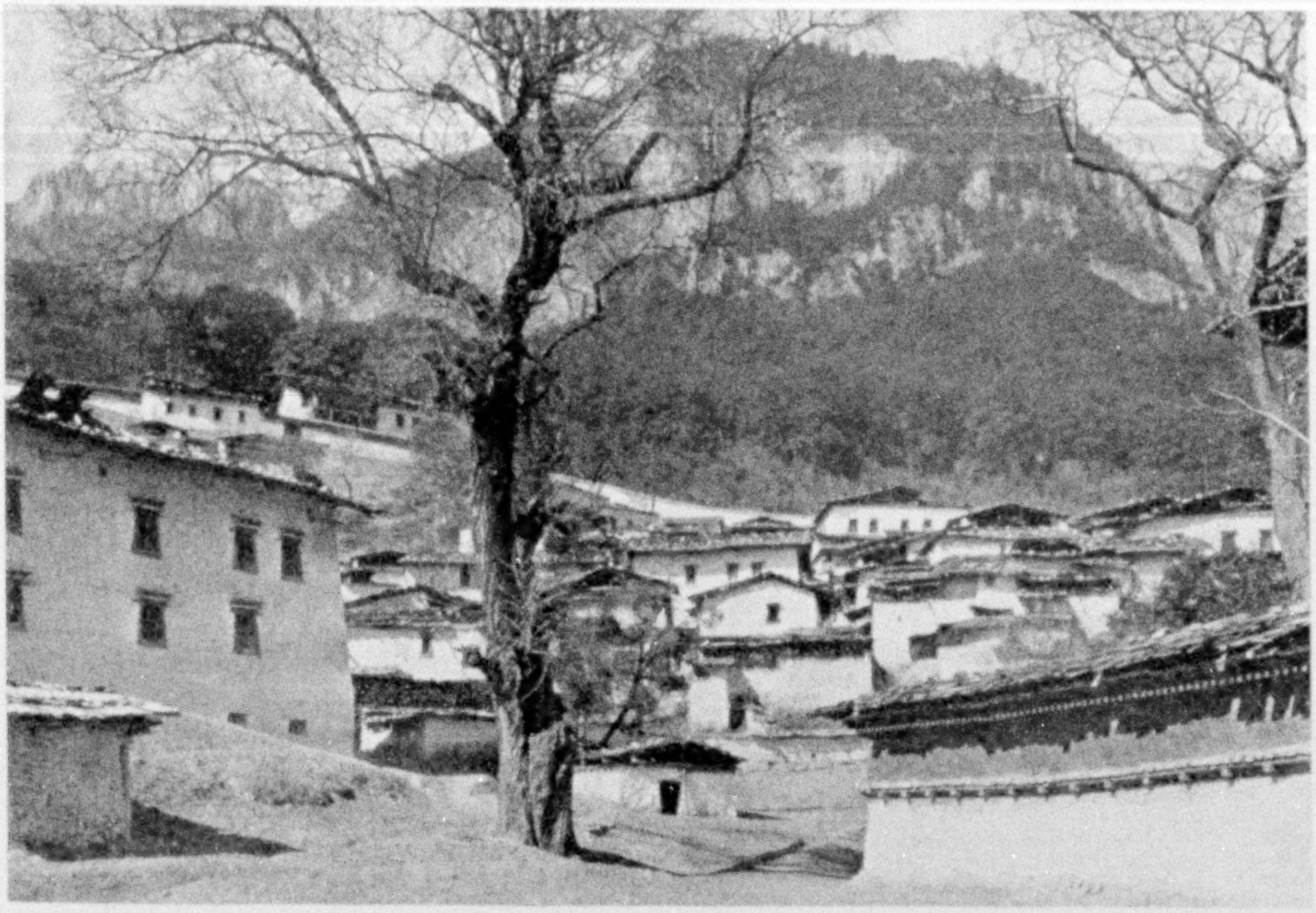
A GROUP OF LÜSHI TOMBAS, OR WITCH PRIESTS, SEATED IN A FIELD ON THE YOUNGNING PLAIN

Like the Likiang Nashi, the Lüshi have Tombas, who are engaged solely for the purpose of dealing with and driving out evil spirits which cause illness, bad luck, etc. (See "Banishing the Devil of Disease Among the Nashi," in the NATIONAL GEOGRAPHIC MAGAZINE for November, 1924.) These priests are surrounded by drums and bowls full of gods made of dough, and other paraphernalia. In front of them, not visible in the picture, was an altar of pine sticks, oak branches, and perforated paper smeared with pig's blood. They were concerned with the driving out of a devil who had caused a stomach ache in a village headman.



LOOKING UP TO MULI FROM THE BANKS OF THE LITANG RIVER

The walled capital of the lama kingdom can be seen on the top of a hill just below Mount Mitzuga (see also page 466).



WITHIN THE WALLS OF MULI, SHOWING THE DWELLINGS OF SOME OF THE 700 LAMAS

This view of the lamasery was taken from a vantage point near the king's palace.

We zigzagged through a gloomy wood to the summit of the range. A flood of sunshine burst upon us as we reached the top, a flat expanse of lovely forest land.

A log cabin, with smoke issuing from beneath the roof and cracks of walls, gave shelter to some Lüshi who guard the pass and flee at the first sign of approaching bandits to warn the chiefs of the Youngning monastery.

THE EXPEDITION ARRIVES AT YOUNGNING MONASTERY

It was a pleasant contrast to pass from the enormous canyons and ravines to the Youngning plain, which swarmed with duck, heron, crane, and geese. That afternoon we reached the monastery and its hospitable shelter, being guided by the chief lama's secretary, an unkempt, beardless monk.

Youngning, known to the Nashi as Yuling, or Yuli, as they are unable to pronounce a final ng, is the seat of three chiefs whose ancestors were Mongols, elevated to power by Kublai Khan in the 13th century.

Here we learned for the first time that the old Muli king had died of dropsy the year before, and that his younger brother had now been on the throne for four months. The latter was said to be an amiable man and much more hospitable than his late royal brother, who two years before had told me politely not to visit him.

Leaving Youngning, we followed the western margin of the plain along a trail lined with roses and prinsepia shrub. The latter has fleshy stems on which white drooping flowers are arranged in a row like dewdrops.

AN ENCOUNTER WITH A RICHLY CAPARISONED CAVALCADE

A walk of a few miles brought us to Wualapi, a squalid Lüshi hamlet built on a hillside.

From Wualapi to the boundary of the Muli king's domain is only a short distance.

The first Hsifan village across the border is Likiatsuin, a two days' journey from Muli.

After an arduous climb, we came upon a glorious alpine meadow, a rolling hillside framed by black fir and hemlock—mighty trees 150 feet in height, with trunks from 5 to 6 feet in diameter. No woodman's ax has ever echoed there.

Hark! A cavalcade of 20 men approaches, clad in brilliant red garments and gold-brocade jackets. They ride on red saddle blankets trimmed with leopard's fur. Each carries on his left side a miniature Buddhist shrine of silver, a reliquary for protection on the journey.

A lama of lower grade stops one of my men and roughly demands to know whither we are bound.

Before an answer can be given, the priest motions my man to get off the path, as the king's brother is approaching.

The Nashi answers curtly, "Get off yourself, for my master is behind me."

I now take part in the interchange of "civilities," giving the lama a lecture accompanied by threatening gestures. Out comes the priest's tongue in deference, which, with upward-pointed thumbs, denotes the most humble mode of greeting where Tibetan customs are in vogue.

We pass the cavalcade without a sign of recognition by either party.

A HSIFAN WOMAN OF MULI PHOTOGRAPHED IN THE MULI VALLEY

She came to the author's camp to sell grass for the horses. On her head she wears a bandeau of amber and gilded rupees.

HOT WATER FREEZES ON HANDS AND FACE

On we climbed over a steep and rocky trail. High cliffs were to our left, with hanging boulders supported by the roots of fir trees which had found a lodging in the cracks. The sky turned black, a stillness filled the forest; the watch showed 5 o'clock and we were yet a long way from the predetermined camping place.

Since our caravan was not in sight, we decided to stop for the night on a tiny meadow near a cliff. Deep snow lay all around us, but there was no water. A blizzard swept down from the mountain crags through the forest, and we huddled together for protection around the huge trunk of a fir tree. The mules arrived half dead; there was no shelter for the night, and leopards were prowling around.

Had we gone farther, however, it would have been colder, for the aneroid already registered 14,000 feet above the sea. With numb fingers we pitched our tents. The snow continued and the wind increased in violence. We melted snow

for coffee and cooked a makeshift supper; then crawled into our blankets.

A glorious morning greeted us, but the cold was so intense that hot water froze on my face and hands when I attempted to make my toilet. We were glad to leave this camp site.

We reached the pass, 15,000 feet above the sea, in gorgeous sunlight. To our right was a line of crags, snowcapped and glistening like diamonds.

The pass is supposed to be infested with brigands, who lurk behind the stupendous crags, but we were not molested.

We descended through a steep forest of spruce and fir, with rhododendron trees as underbrush; lichens and mosses covered trunks and boulders. All was hushed.

A LÜSHI WOMAN OF THE VILLAGE OF WUALAPI

She carries water in a wooden tub on her back.

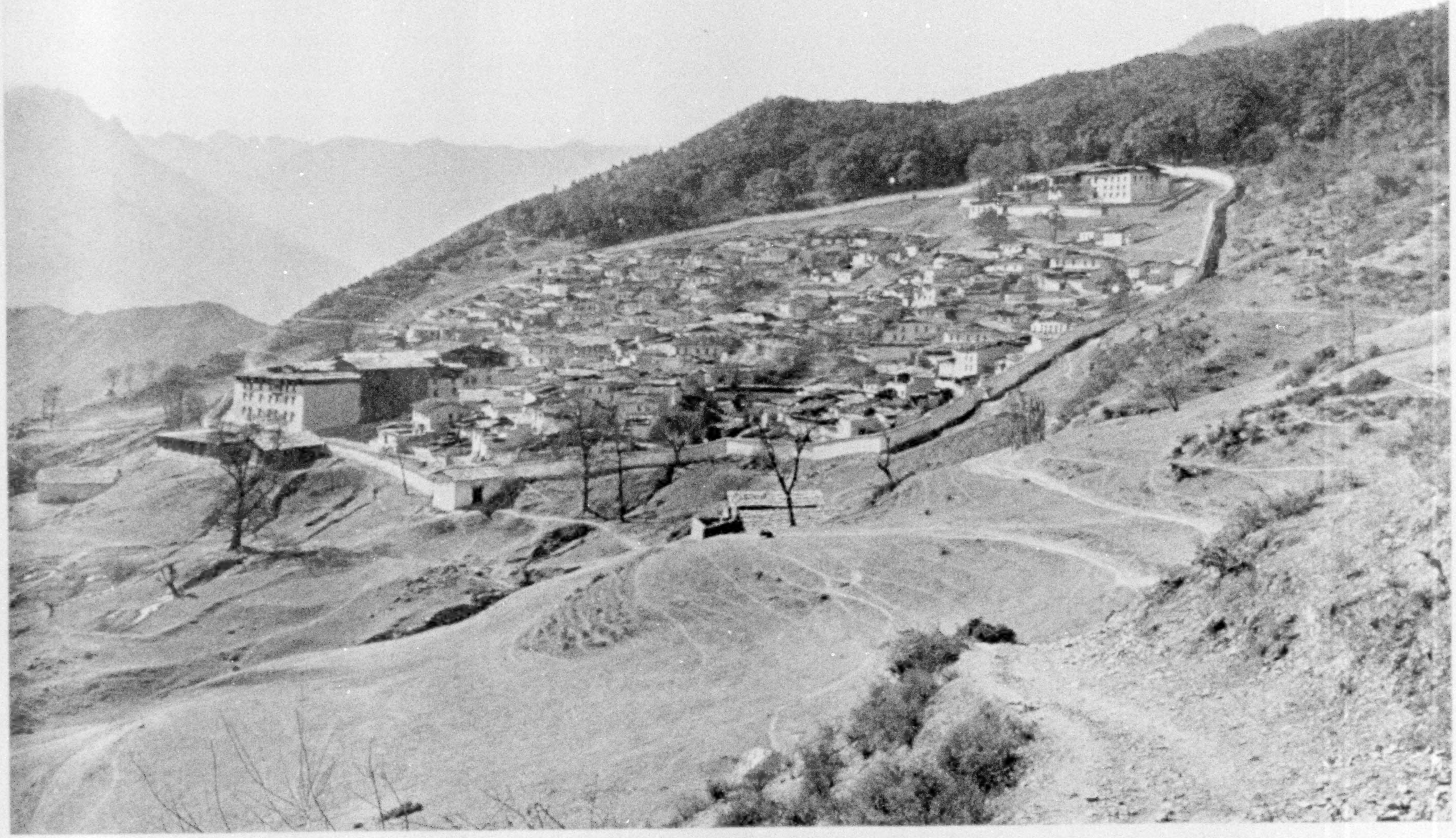
The trail led down a spur jutting out into a deep canyon in which flows the Muli River. To the left a high range, crowned by volcanic cinder cones of perfect shape, testified to the mighty upheaval which once occurred here.

One of my soldiers took me to an open spur and pointed north, where, upon a sloping hillside, lay Muli, bathed in the sunlight. I also looked upon a sea of mountains, range upon range, like the furrows in a field, with a deep ravine from north to south, down which runs the Litang River, flowing eastward into the Yalung, which in turn empties into the Yangtze, some weeks' journey distant.

As it would not do to arrive in Muli unheralded, I dispatched a soldier with my card to the lama king, and a message that I would enter the capital early the following day. Some of my Nashi men, who had been to Muli several times, were anxious that I give proper presents to the king, lest we be uncivilly received.

A LAMA EXTENDS A WELCOME TO MULI

We pitched camp on the bank of the Muli River, 8,000 feet above the sea, and here we made our first acquaintance with Muli villagers, especially the women, who barter grass and barley for the horses of caravans. Their dress consisted of dark-gray woolen skirts with fringes, and leather jackets. Their wealth of hair, a good deal of it false, was decorated with garlands of gilded Szechwan rupees, a coin common in this region (see page 464).



THE LAMA CITY OF MULI, ON THE SLOPES OF MOUNT MITZUGA, OVERLOOKING THE MULI AND LITANG RIVERS

The massive building in the foreground is the king's palace. The large building at the upper right is the most sacred shrine of Muli (see page 477).

At dawn we broke camp on the river, now only a bubbling brook, and climbed the western hillside. We had gone about two miles when we met a lama, dressed in deep-red woolen cloaks, and riding on a horse whose saddle blankets were made of leopard skins and Tibetan rugs.

He dismounted, took off his turban, bowed deeply, and humbly presented the king's card, then made a little speech in Tibetan, which my cook, whom I had asked to ride with me to Muli instead of staying with the caravan, interpreted as kind greetings and an invitation to be the king's guest.

The lama led the way up and around the hillside, past prayer pyramids of carved rock bearing the ever-present sacred formula, *Om Mani Padme Hum* (Oh, the Jewel in the Lotus, Amen).

Turning a sharp curve around a spur, we were confronted with the walls of Muli and the main gate to this lama stronghold. A row of courtly priests stood waiting and bowed at my approach.

I was conducted along the wall to a new house with a terrace, outside of Muli proper, and when I was comfortably settled, I was asked when I wished to see the king, who was anxious to meet the stranger.

I requested the lama to convey my greetings to His Majesty and say that I would call as soon as my caravan had arrived, after I had changed my riding clothes for those suitable to wear in the presence of royalty so illustrious as the King of Muli.

MULI IS BOTH CAPITAL AND LAMASERY

The rulers of Muli are said to be of Manchu origin. They were given the sovereignty of the kingdom in perpetuity in recognition of valorous services rendered to Yungcheng, the famous Manchu emperor, who ascended the throne in 1723 of our era.

The King of Muli holds sway over a territory of 9,000 square miles—an area slightly larger than Massachusetts—but he has only 22,000 humble subjects.

The kingdom is so mountainous that it is impossible to cultivate the soil except along the Litang River and in the narrow valleys of its tributaries descending from the mighty ranges.

Though Muli is the capital, it is in reality only a lamasery of 340 houses tenanted by 700 monks, who pray unceasingly. The villagers occupy wooden shanties scattered over the hillsides below the town. They are very poor, and live in constant fear of the lama king and his parasitic satellites. The kingdom boasts of 18 lamaseries—3 large and 15 small ones.

Next in importance to Muli lamasery comes Waerhdje (or Wachin), about 18 miles to the north, as the crow flies. It has 270 lamas. The third large lamasery is Kulu, with 300 lamas, lying about 25 miles southeast of Muli.

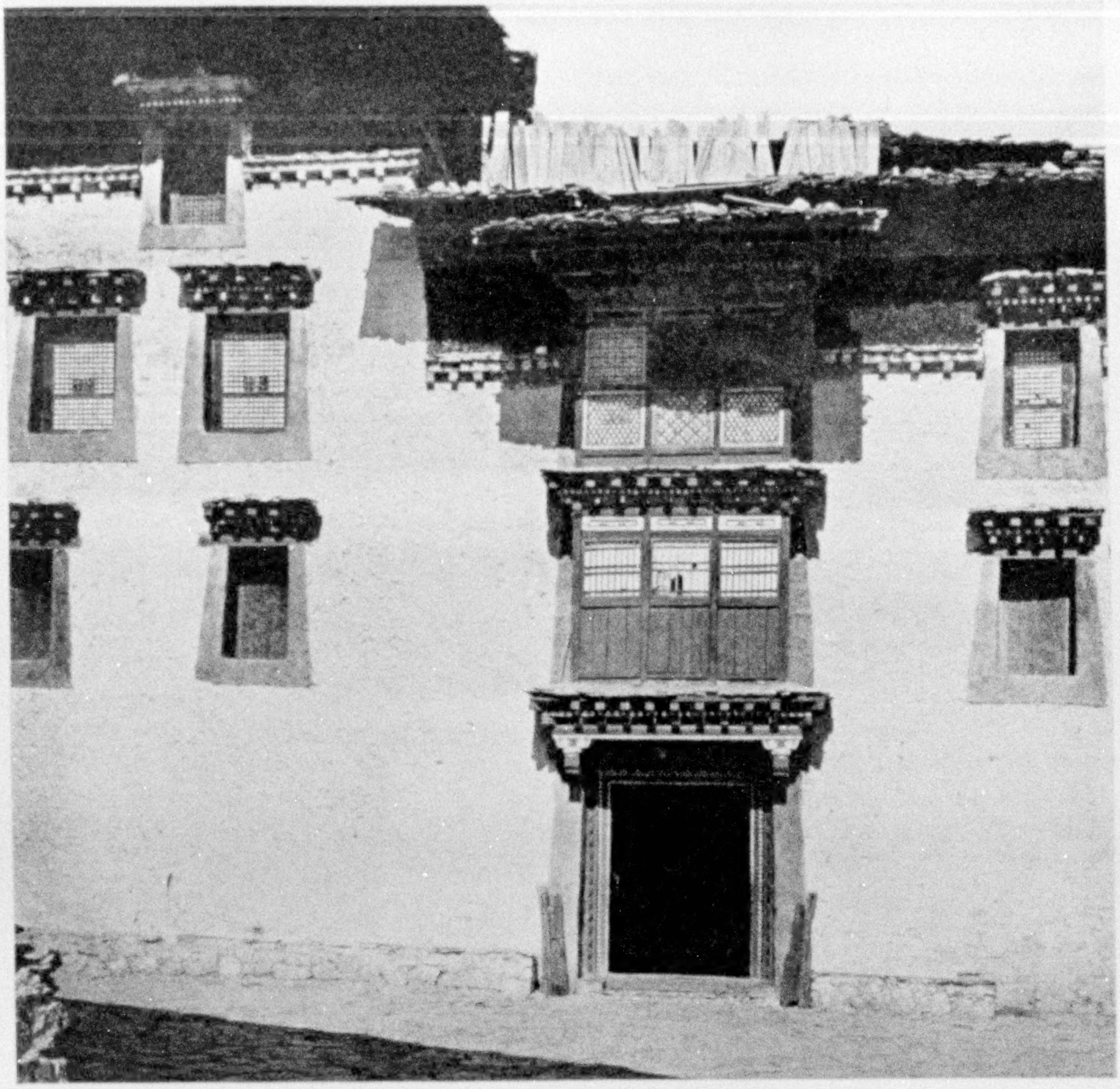
The king, followed by his government, resides one year in each, always in the same rotation—Muli, Waerhdje, and Kulu. Of the other places in his kingdom he knows nothing.

The Muli lamas belong to the yellow sect of the reformed Tibetan church. Their cloaks are always red, but the distinguishing mark of the sect is the yellow ceremonial hat. It is usual for two or three out of every five male members of a family to become lamas. When there are three brothers in a family, two become lamas, and the third often marries several wives to carry on the family.

The dignity of prince lama is hereditary, a successor always being chosen from the brothers or nephews of the deceased. The ruling lama is called *Gyalpo*, or king, and confines himself to civil and judicial administration, although he is also vested with full ecclesiastical authority. The next highest official in the kingdom, except perhaps the Living Buddha of Muli, is the lama lord high treasurer, the second lord commissioner.

In matters affecting Chinese interests, the king is supposed to communicate with the prefect in Yenyüan, 70 miles to the southeast, or in Ningyüanfu, 90 miles to the east. However, no notice is now taken of any Chinese magistrates, who are only too happy to be left alone in their insecure position, while the lama king is firmly entrenched.

Muli is a rich possession, as all the rivers, especially the Litang, carry gold and produce a considerable revenue. Rights for washing and mining gold are vested in four lamas under the king, who exercises a jealous control.



THE GATEWAY TO THE PALACE OF THE KING OF MULI

The building has massive rock walls several feet thick; the open bay window of the top floor is in the lama king's reception room. The walls are whitewashed and the stone window frames are painted an ultramarine blue (see page 478).

The lay population is subject to military service, and the king's levies are called out almost yearly to ward off attacks by Mantzu tribes bent on pillage.

THE VISITOR PASSES THROUGH A STABLE TO REACH THE THRONE ROOM

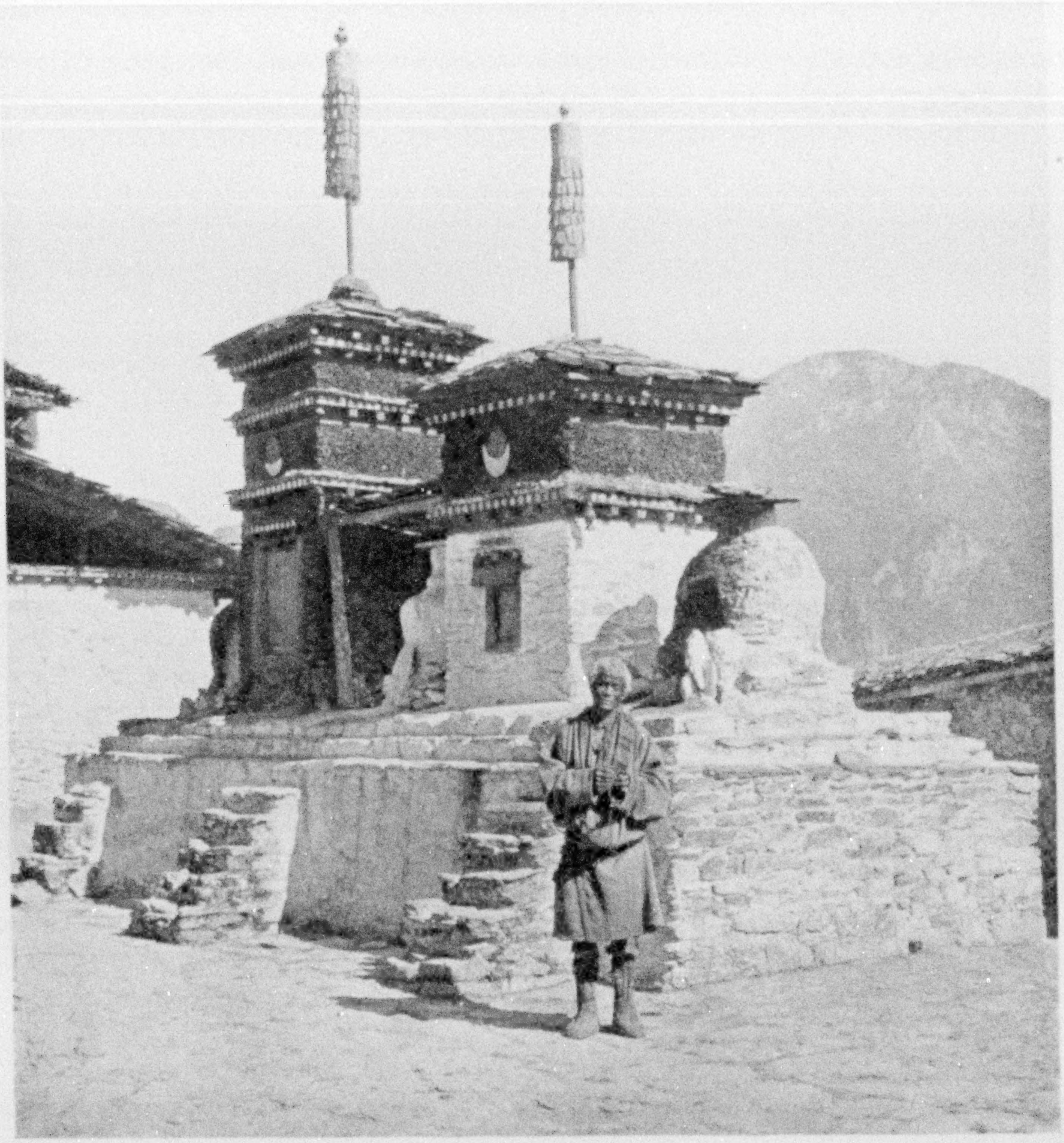
My caravan finally arrived. I donned my best and sallied forth to meet the king. The prime minister, or lord treasurer, and the king's secretary, who spoke Chinese excellently, accompanied me to the palace—a large stone structure on the lower edge of Muli, built 60 years ago.

I took with me my Siamese boy, the Tibetan cook, and two Nashi servants, all dressed in their best and carrying as presents for the king a gun and 250 rounds of ammunition.

We were escorted to the palace square, which is surrounded by a temple, from which issued the discordant sounds of trumpets, conch shells, drums, and gongs, besides weird bass grumblings of officiating monks.

The gateway to the palace was imposing. At either side of it two large bundles of whips were displayed to impress the villagers.

Immediately within the gate is the king's stable, ill-smelling and dark, leading into a small, oblong courtyard graced



CHIMNEYS IN FRONT OF THE PALACE AT MULI

These are used to burn pine branches and incense as spirit offerings. In the foreground is a Muli villager.

by a stunted tree, supposed to lend cheer to the somber place.

We ascended a broad, steep stairway in utter darkness. The steps were close and narrow and the railing was so low to the ground as to be useless. I had to feel my way.

AN AUDIENCE WITH THE KING OF MULI

Two flights up and we stood before a greasy curtain, black from the marks of buttered fingers. A Hsifan servant drew it aside and we passed through an antechamber, then a large, bright room, and we were in the presence of the king.

On my approach he rose, bowed, and beckoned me to a chair next to a small table loaded with Muli delicacies. He occupied a chair, facing me.

I had great difficulty in distinguishing my host's features, as he sat with his back to the light coming from an open bay window, while he watched every muscle of my face.

The king stood 6 feet 2 inches, in high embroidered Tibetan boots of velvet. He

THE KING OF MULI IN HIS ECCLESIASTICAL ROBES

His Majesty posed for this photograph on his throne, in the reception room of his palace. Compare with the photograph of the king wearing his elaborate robes of state, on the opposite page.

THE KING OF MULI IN THE ROBE AND HEADDRESS OF A TEMPORAL RULER

A kneeling lama removed the monarch's boots before he mounted his throne to pose for this picture (see text, page 479). Note the magnificent silk embroideries which are used for a background.

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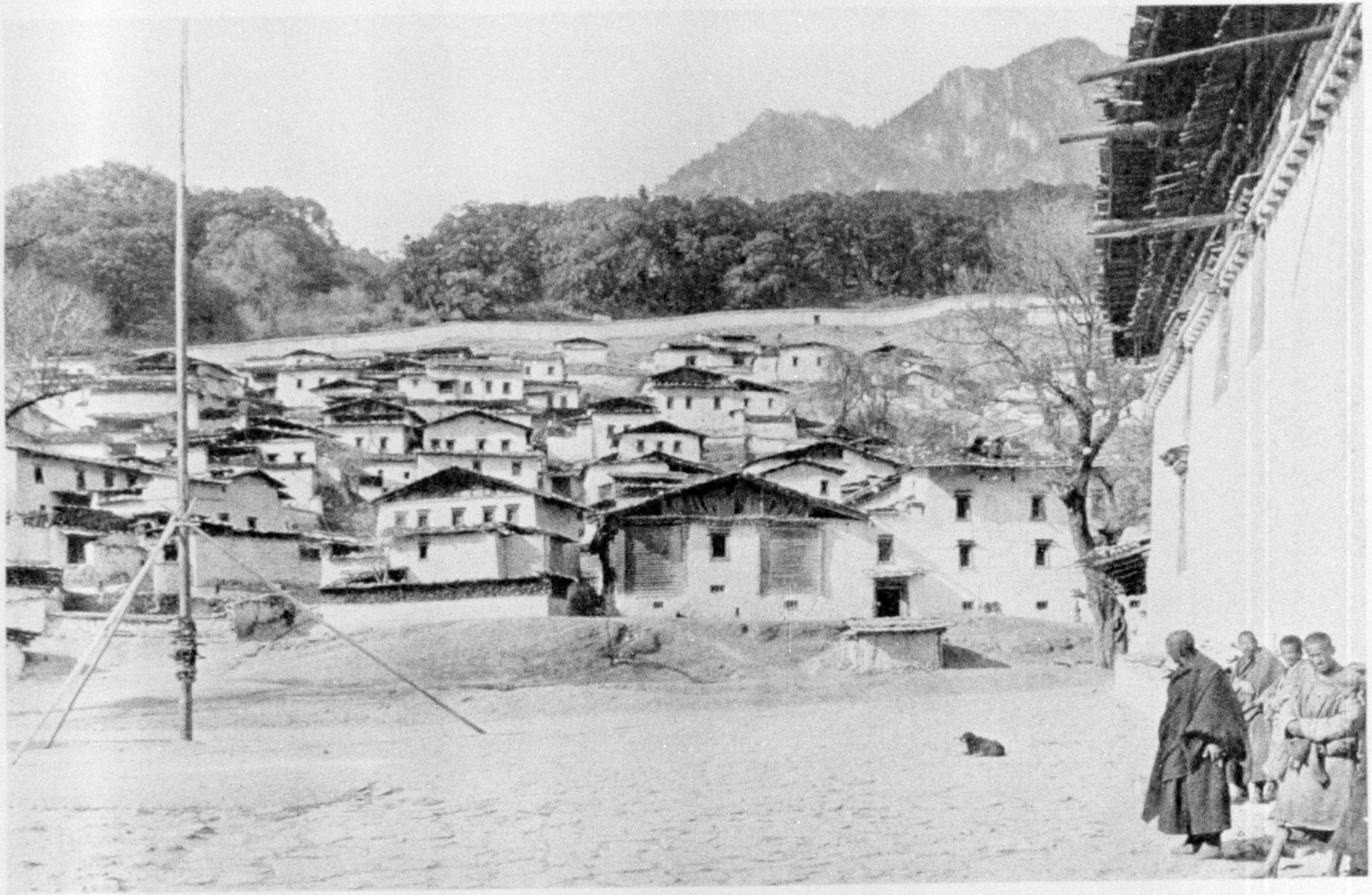


THE EASTERN PART OF THE MULI LAMA MONASTERY AS SEEN FROM SOUTH OF THE PALACE SQUARE

At the left is a flag (prayer) staff and in the right foreground is a part of the palace.

THE BODYGUARD OF THE KING OF MULI IN FRONT OF THE PALACE TEMPLE

The two lamas in the center are the highest military officials of Muli. Their togalike uniforms of red partly conceal their jackets of gold brocade (see text, page 480).

TWO HSIFAN WOMEN OF MULI WHO ACCOMPANIED THEIR HUSBANDS TO THE CAMP AT AGÙ (SEE PAGE 491)

lamas in most deferential attitudes, with bowed heads and folded hands, awaiting his slightest suggestion. Next to the lamas stood my servants, much bolder than the king's prime minister.

I spoke first, saying that I had heard much of the splendors of Muli and of the king's beneficence, and that I had long wished to meet him. He replied that Muli was a very poor place, and that he felt honored by my visit, coming, as I had, from so distant a country as America, whence no other man had ever come to Muli.

THE KING ASKS MANY QUESTIONS

I doubt whether until that time he had known of the discovery of America. He did not have the slightest idea of the existence of an ocean, and thought all land to be contiguous, for he asked if he could ride horseback from Muli to Washington, and if the latter was near Germany.

During a lull in the conversation, he whispered to his prime minister, but kept an eye on me. The embarrassed official translated, with folded hands and forward-bent body, a most astonishing question: "Have the white people stopped fighting and are they again at peace?"

The next inquiry was whether a king or a president ruled great China.

Then, the king suddenly held forth his hand, asked me to feel his pulse and tell him how long he was to live! From this he jumped to field glasses, asking if I had a pair with me which would enable him to see through mountains.

He then whispered some orders to a

was 36 years old, of powerful frame; his head was large, with high cheekbones and low forehead. His muscles were weak, as he neither exercises nor works. His manner was dignified and kind, his laugh gentle, his gestures graceful.

He wore a red, togalike garment, which left one arm bare. Below the tunic was a gold and silver brocaded vest and on his left wrist a rosary.

The king has one younger brother, a lama destined to rule, and one older brother, a coarse individual, who looks more like a coolie than a prince. The latter, who wore silk garments lined with fur, and uncut diamonds on his fingers, carries on the family.

At the king's right was a group of

lama, who, with great reverence and hands folded in prayer, said "Lhaso, Lhaso," a term of humble acquiescence, and, walking backward, retired.

I glanced around the audience chamber. It was a room of considerable size, well decorated with frescoes in rather garish colors, depicting scenes from the life of Buddha and lesser gods. The pillars supporting the ceiling were red and adorned with a sort of gold appliqué work.

Odd as it may seem, in all this Lamaistic splendor there was a Western touch, for on the crimson-painted posts were clothes-hooks with white porcelain knobs, such as one would expect to find on trees in a cheap German beer garden. Suspended from the rafters and from the walls were old-fashioned kerosene cellar lamps, with rusty rings for protection of the chimneys. That they were meant for decoration was obvious, as no kerosene ever reaches this king's domain.

No matches or candles could be had here, and the black, greasy necks of all the lamas, including the king and Living Buddha, showed that soap was not in demand.

THE KING ENJOYS A LECTURE ON WESTERN LIFE

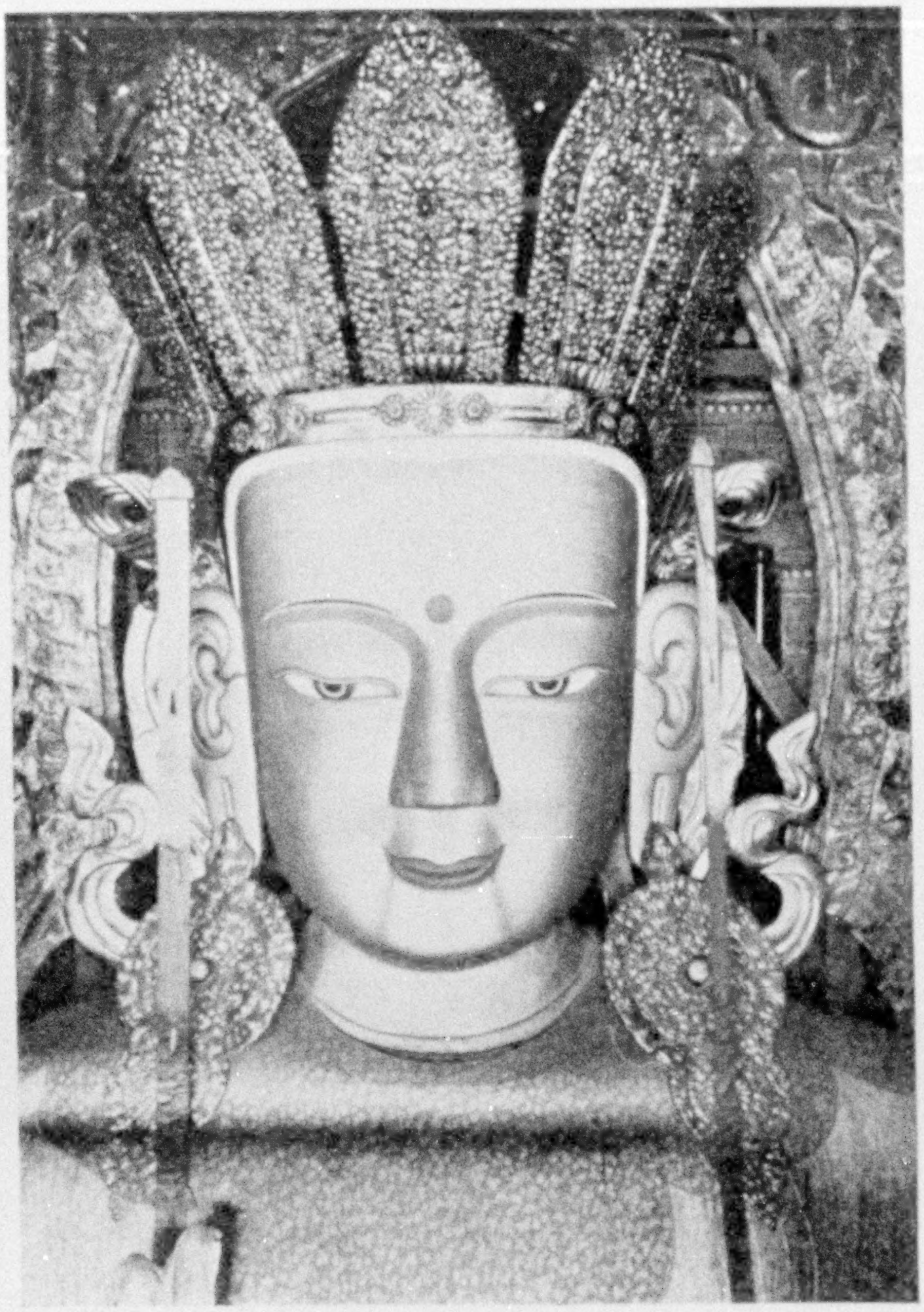
The prime minister soon returned with a stereopticon and some faded photographs. The king evidently thought this a splendid opportunity to satisfy his curiosity. The pictures were handed me one by one, and I had to explain what they represented, from the captions in English on the cardboard. The first was the dining room of the White House, in Washington; the others ranged from Windsor Castle to Norwegian fjords, and wound up with a jolly pre-war crowd in a German beer garden.

I interpreted, as best I could, these representations of our Western life, to all of which the king nodded silently, not much the wiser, I should judge.

After the lecture, the king urged me to partake of Muli delicacies. There was gray-colored buttered tea in a porcelain cup set in exquisite silver filigree with a coral-studded silver cover. On a golden plate was what I thought to be, forgetting where I was, Turkish delight, but it proved to be ancient mottled yak cheese,

A MEMBER OF THE MULI KING'S BODYGUARD

He wears a red-cloth uniform trimmed with leopard skin, high black Tibetan boots with red leather ornaments, and a crimson turban. In his belt he carries a silver-sheathed sword.



THE HEAD OF MULI'S 50-FOOT STATUE OF BUDDHA

The head (face), without the crown, is 10 feet long. The picture was taken from a gallery in a great chapel on the second floor of the palace building in which this huge idol is housed (see page 480).

interspersed with hair. There were cakes like pretzels, heavy as rocks.

It was an embarrassing situation, but, in order not to offend His Majesty, I took a sip of tea, which was like liquid salted mud. I then requested the privilege of taking photographs in Muli, and, if he would permit, some of His Majesty himself; whereupon he smiled in acquiescence. The hour was set for the next morning after prayers.

While we were talking about photography, the king issued an order to the lamas. They rushed out and returned in a few minutes with two huge boxes tied in skins, from which, to my astonishment, they took two cameras of French make, with fine portrait lenses; also an Eastman kodak, boxes with plates, rolls of printing paper, and spools of film—all of which had been opened and examined in broad daylight!

When I explained that all the plates and films and papers had been ruined, they laughed in unison and momentarily His Majesty's presence was forgotten. The king explained that the outfit was a present from a rich Chinese trader who once passed through his kingdom.

There were chemicals sufficient to start a photographic shop, but none of the court knew what they were. They watched me in awe, as I read the labels, and the king, without asking my permission, detailed a trembling lama to come to my house that very afternoon and learn all about photography within an hour!

I pitied the poor lama whose destiny decreed him to be the king's photographer. Although he was a very humble apprentice at my rough studio, he must have wished me elsewhere. He learned about as much that afternoon as the meandering yaks outside my house.

After two lamas brought trays filled with mandarins and pretzels, I bowed and left His Majesty, who accompanied me to the greasy curtain, which he raised to let me pass.

ROYAL GIFTS TO THE EXPEDITION

Hardly had I arrived at my rustic house when there appeared nine stalwart Hsifan men, accompanied by the prime minister, bringing gifts from the king. There were eggs in plenty; a large bag of the whitest rice, two bags of beans for

THE CHIEF SANCTUARY OF MULI SURROUNDED BY A SPECIAL WALL WITHIN THE WALLS OF THE CITY (SEE ALSO PAGE 466 AND TEXT, PAGE 478)

the horses and one of flour; one wormy ham; dried mutton; lumps of gritty salt, more of that doubtful yak cheese, and butter wrapped in birch bark.

All the gift-bearers stood as I distributed silver coins. Three cakes of scented soap were presented to the prime minister.

As the king's porters left, a hungry mob of beggars gathered outside our gate. The dried legs of mutton and yak cheese were literally *walking* all over the terrace of our house, being propelled by squirming maggots the size of a man's thumb. I was informed that these were the choicest delicacies from the king's larder. As none of my party wanted the lively food, we gave it to the beggars, who fought for it like tigers.

All afternoon there droned forth from the sword temple, near the palace, the mournful sound of trumpets, gongs, and conch shells, occasionally accompanied by brass cymbals and the beating of a drum. In the evening, the king's soldiers played the bugles and drums in military fashion; a shot was fired at 8 p. m. and a bugler sounded taps.

When I had opportunity to decipher the king's calling card I learned that though his name is, briefly, Chote Chaba, his full appellation is "Hsiang tz'u Ch'eng cha Pa, by appointment self-existent Buddha, Min Chi Hutuktu, or Living Buddha, possessor of the first grade of the Order of the Striped Tiger; former leader of the Buddhist Church in the office of the occupation commissioner, actual investigation officer in matters relating to the affairs of the barbarous tribes; honorary major general of the army, and hereditary civil governor of Muli. Honorific: Opening of Mercy."

The ruler's knowledge of Tibetan was very poor, and of Chinese he knew next to nothing. He used to reside in Kulu before he became king, and was the Living Buddha of its monastery.

Early next morning the trumpeters were busy and the drummers, too. About 10 a. m. we made our way to Muli proper, within the walls, to take photographs of the temples, buildings, prayer wheels, and other things of note. The king was attending prayers.

The massive palace had window frames

THIS GIGANTIC PRAYER WHEEL HAS A BUILDING TO ITSELF

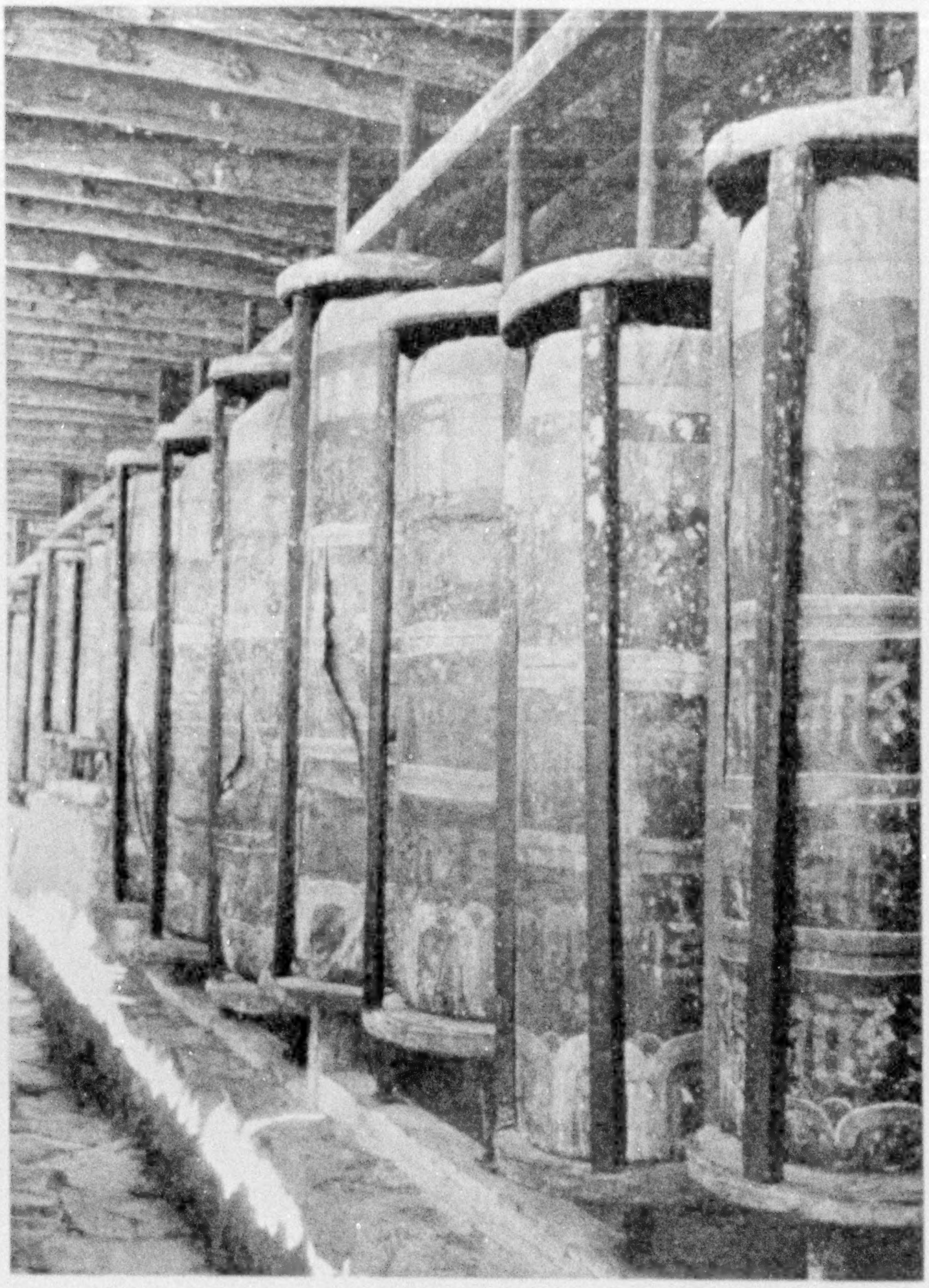
The prayer house is opened only for one hour after luncheon. The cylinder is of gilded and decorated yak hide (see text, page 491).

painted an ultramarine blue, and decorated ends of beams bearing the Buddhist colors of red and yellow. In the windows were wooden shutters made like doors (see page 468). The windows may now have glass, for I suggested to the king that he have the photographic plates washed and used as windowpanes, since they were useless for making pictures.

The prime minister guided us through Muli, even to the great sanctuary, called Churah, surrounded by a special wall (see p. 477). A rude monk was about to slam the big gate in my face, when he spied the prime minister, and humbly, with outsticking tongue, threw it wide open.

NO PHOTOGRAPHS PERMITTED IN THE CHIEF SANCTUARY

A long flight of rocky steps led to the inner shrine, housing many gilded gods under yellow silk umbrellas. In the center, as if on a throne, was one swaddled in yellow cloth, entirely hidden, too sacred



A ROW OF CYLINDRICAL PRAYER WHEELS OF COWHIDE

The sacred formula, "Om Mani Padme Hum," is reprinted thousands of times on the paper which is wrapped around the cylinders. This row of prayer wheels is built against the wall of the king's palace, and passing lamas turn each one as they go by (see text, page 490).

to be gazed upon. Before this image our guide made deep obeisance.

This sanctuary was the only place where we were asked not to take any pictures unless the king himself were with us and gave permission.

Long cylindrical umbrellas of blue, yellow, and purple silk hung from the ceiling, while against the whole length of the posterior wall was stretched an enormous painting of Buddhistic scenes.

The adjoining house was empty. To the right of the sacred shrine was a garden with a pavilion at the upper end, in front of which was an open platform. To its left was a square, raised seat of stone.

In the pavilion is a throne which Chote Chaba occupies once every three months, when all the lamas gather to undergo examination in the Buddhist scriptures. The beautiful painting forming the back of the throne represents Kwan-Yin, the Buddhist Goddess of Mercy.

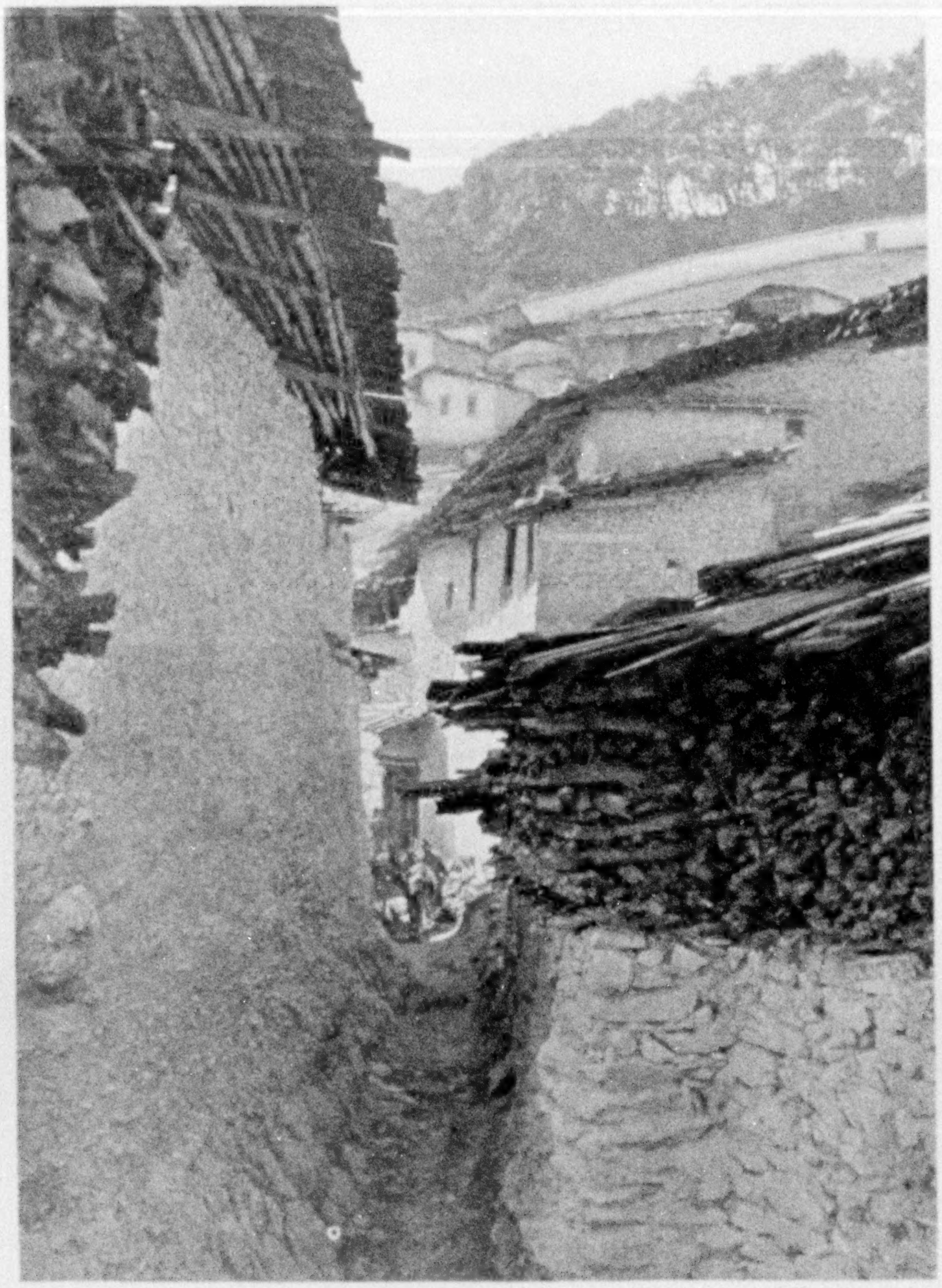
We descended through narrow lanes by lama houses, each with firewood stored for the winter beneath the pine-board roofs, to the main palace square.

PREPARATIONS ARE MADE TO PHOTOGRAPH THE KING

The king spied me from his window, beckoned me upstairs, and received me kindly. Soon I had made preparations to take his first photograph.

I selected a spot against the wall, under the fat-bellied God of Luck. The monks flew in all directions, and brought numerous well-wrapped bundles containing beautiful carpets, tiger skins, gold brocade, and yellow embroidered silks and shawls. The throne was placed on the spot selected, and the carpets, cushions, and hangings arranged satisfactorily (see pages 470 and 471).

After a kneeling lama had taken off the king's boots, he stepped nimbly to the throne and sat cross-legged, his merry, boyish face assuming a solemn expression. A yellow and white silk cloak was placed over his shoulders and a yellow hood upon his head.



LOOKING DOWN A MULI STREET

The thoroughfares of the capital are very narrow and steep and are paved with limestone rocks.

made in his new office as court photographer.

The king expressed a wish to have me photograph his lama officials and bodyguard, which I gladly did. When I withdrew, he presented me with long bolts of woolen cloth called *pulu*, on top of which he placed his rosary, unwound from his left wrist. We parted the best of friends.

Before I left, the lamas took me to an enormous chapel wherein sat enthroned the statue of a gigantic Buddha, 50 feet in height, made of bronze and covered with gilt and golden bands. Owing to lack of space, I had to be content with photographing the Buddha's head from the upper gallery, where monks were busy making silk hats for the king's entourage.

After luncheon I was escorted to the palace square, where the king's officers and soldiers, his private guard, were assembled. Two lama officers, in spotless red garments and jackets of gold brocade, were the military chiefs of Muli. One was a stout, powerfully built man, with short mustache; the other was lean and almost lost in the folds of his uniform.

The soldiers were splendidly arrayed in red woolen cloth trimmed with leopard fur. They also wore tall red turbans, Tibetan boots of black cloth trimmed with red leather, and in their sashes short swords in silver sheaths (see page 473).

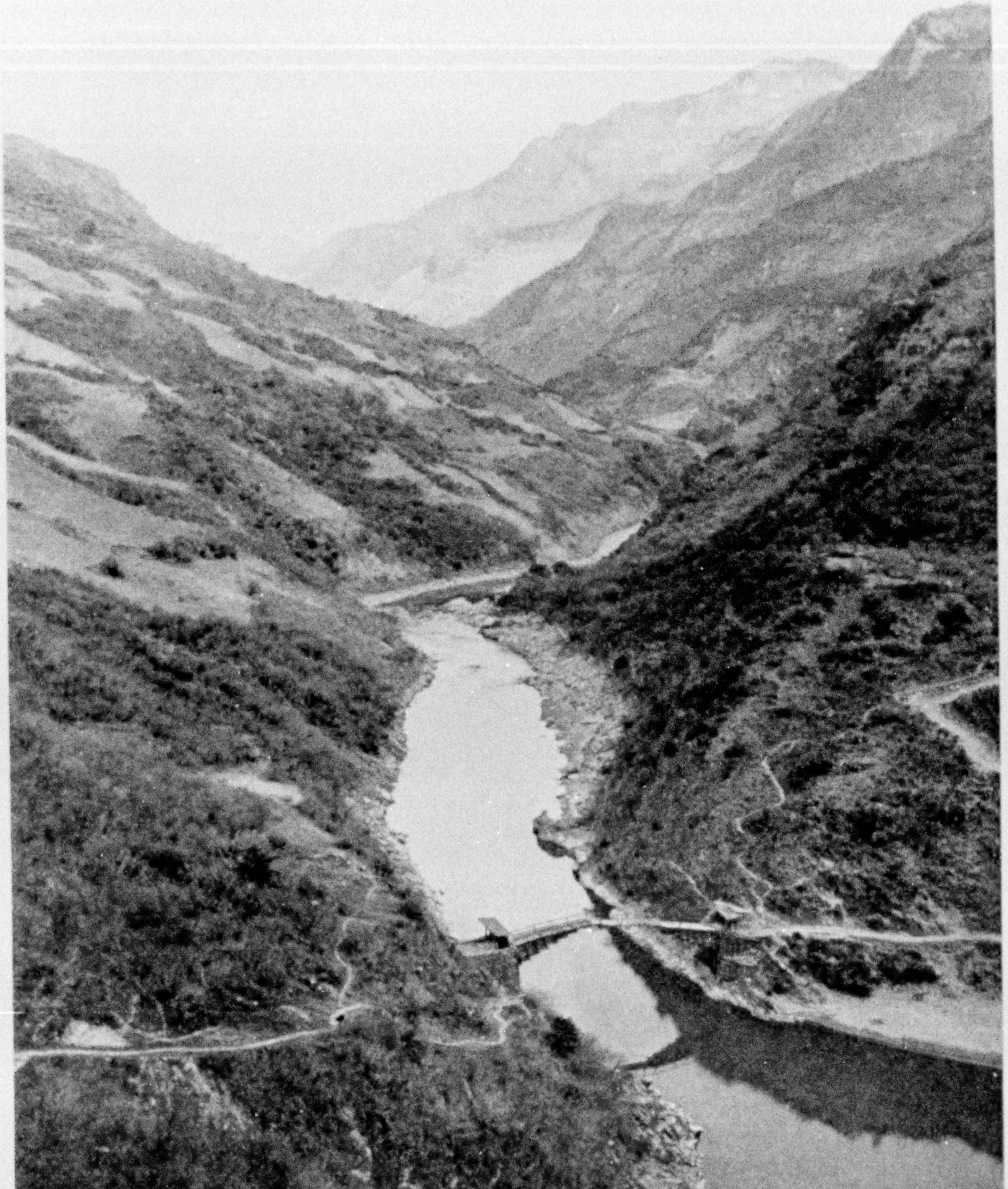
The king's dogs—three King Charles spaniels—jumped on his lap, where they usually repose. With a display of great affection, the royal pets were finally sent away, at my orders.

Then the king sat motionless for nearly 20 minutes, while I took many poses. When all was finished, he stepped gleefully from the throne—a different man.

We sat down and chatted while the new lama photographer was announced. The poor soul crawled into the royal presence on hands and knees and did not raise his eyes until his sovereign touched him on the head in blessing. Then, folding his hands, he whispered with insucked breath an account of the progress he had

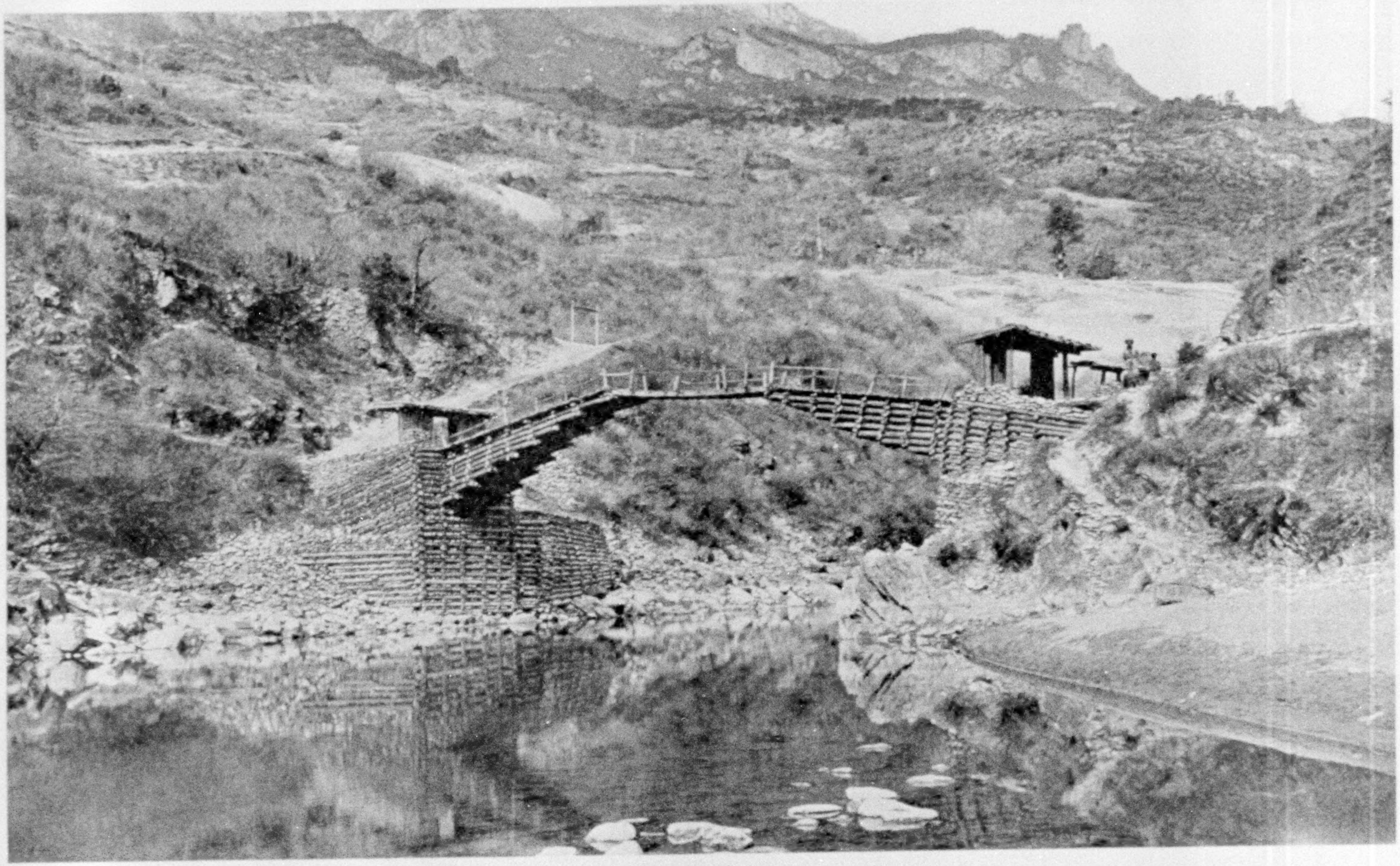
THE ROYAL CHARGER AND THE LIVING BUDDHA ARE PHOTOGRAPHED

While photographing this colorful military array, the king looked down



A WOODEN BRIDGE OF CANTILEVER DESIGN ACROSS THE LITANG RIVER BELOW MULI

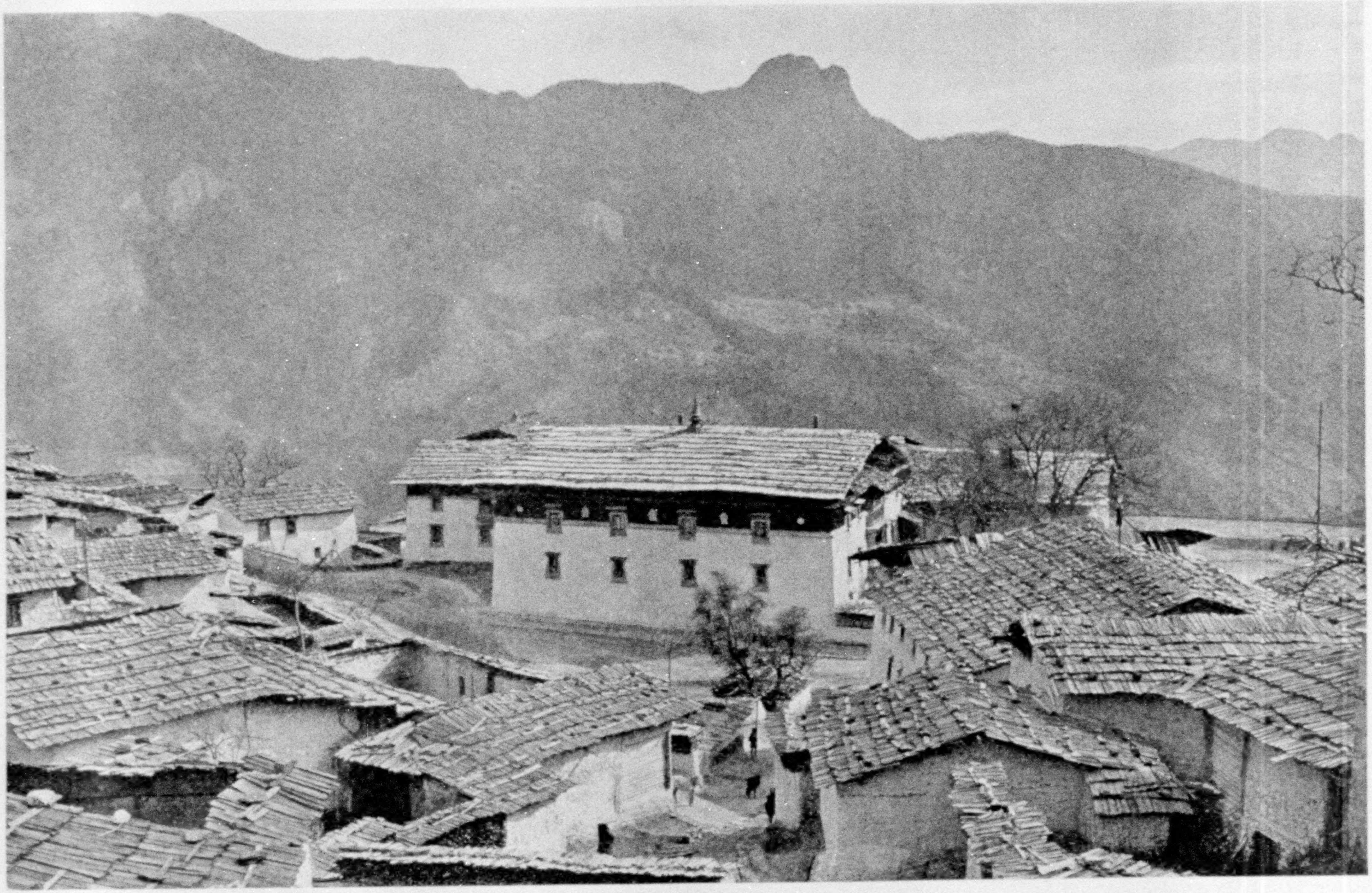
The level of this river, which here flows southward to mingle its waters with the Yalung, is 7,500 feet above the sea (see also illustration, page 482).



THE TYPE OF BRIDGE CONSTRUCTION IN MULI

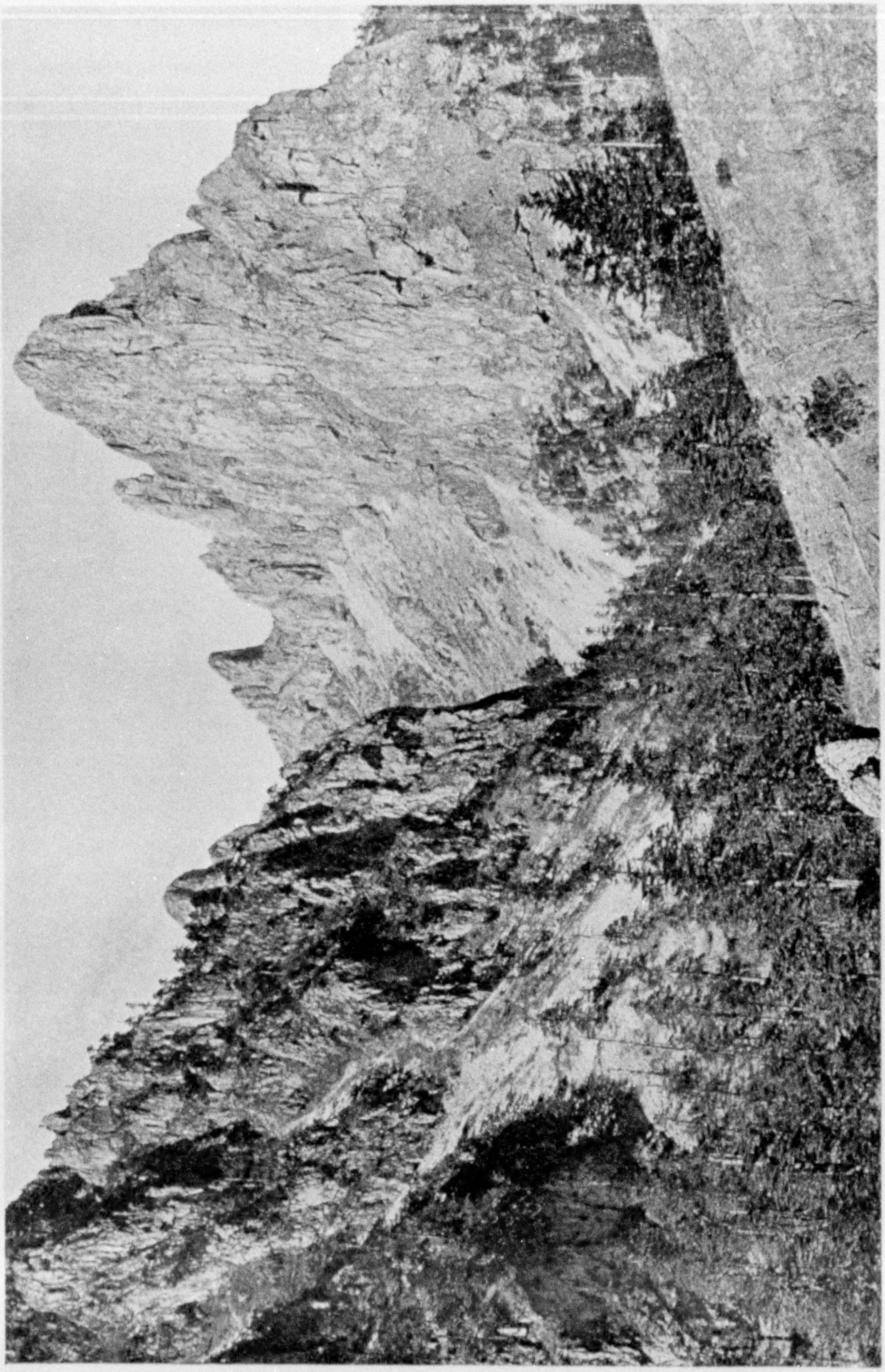
A succession of logs, superimposed, is built out to support a rickety central portion of boards. The latter section can be removed in case of emergency, as, for instance, to prevent robbers from crossing the river and endangering the capital city.

LOOKING UP THE MULI RIVER. IN THE DISTANCE IS THE YANGTZE-YALUNG WATERSHED



THE KING'S PALACE AT MULI (CENTER)

The roofs of the houses are of pine wood weighted down with rocks. The royal residence is a stone structure, built about 60 years ago. The government of the tiny kingdom is theocratic and the lama ruler resides a year at a time in each of three lamaseries (see text, page 467).



THE LIMESTONE CRAGS OF MOUNT CIBOH, OVERLOOKING THE MULI VALLEY, AS SEEN SOUTH OF THE PASS

LAMAS IN RED ROBES AND YELLOW CEREMONIAL HATS CONDUCTING A SPECIAL SERVICE (SEE PAGE 490)

This ceremony took place in a small meadow outside the author's house in Muli. To the accompaniment of the beating of drums and the blowing of trumpets 12 feet long, a bonfire was lighted. Many offerings were thrown into the flames to appease the evil spirits.

HSIFAN PEASANTS SENT OUT BY THE KING OF MULI TO PREPARE A CAMP FOR THE NATIONAL GEOGRAPHIC SOCIETY'S EXPEDITION

The camp, known as Agü, was situated in a small alpine meadow surrounded by a lovely forest, at an elevation of 12,000 feet (see text, page 491).

XUM

THE LIVING BUDDHA OF MULI MOUNTED ON THE KING'S CHARGER

This eighteen-year-old boy, head of the lamas of Muli, is a Tibetan and not a Hsifan. His parents were beggars (see text, page 489). His mother now has a home outside the monastery walls, while he lives in luxury and splendor, being worshiped even by the Muli king. In the background is the king's temple, with curtains twisted around the columns.

upon the scene from the palace window. Presently he sent word that he wished me to photograph his charger fully caparisoned; but to this I demurred unless the king should come down and ride the horse. He declined, saying there were too many people about, and that he did not wish to be seen. He would, however, send down the Living Buddha of the monastery. This pleased me more, as the latter had not yet come before the camera.

The royal steed was an old "plug," unworthy of its splendid trappings. The saddle blanket was of heavy golden-yellow cloth, with a border of Buddhist emblems. Over it was placed another of silk and gold brocade, and on them a saddle frame of gold, beautifully carved, and covered with a heavy cloth of golden thread. The leather straps were similarly covered. Over the horse's mane hung magnificent silk drapings of purple, yellow, blue, and gold. A golden knob resembling a Buddhist stupa was placed ceremoniously on its head.

When the horse was fully arrayed, the Living Buddha came through the somber palace gate. He was a boy of 18 years, fairly handsome, with rosy cheeks glowing from behind an unsuccessful wash. He wore the regulation lama robe of red, with gold brocade, and from his shoulders flowed a silken mantle with embroidered disks and borders. Then appeared the lord high treasurer with a hat of solid gold, wherewith the boy was crowned.

It was a splendid scene, worthy to be recorded on an autochrome plate, but, unfortunately, I could preserve it only in black and white.

The king's temple, with wide curtains twisted around its pillars, made a splendid background. When the Living Buddha appeared, all natives of low degree vanished like the smoke from the incense-offering chimneys in front of the palace. The sky grew dark-gray, and presently snow began to fall. I had to hurry to make the photographs.

HOW A BEGGAR'S CHILD BECAME THE LIVING BUDDHA

This young Living Buddha, who now wore a golden hat and a silken mantle, was the son of a Tibetan beggar family living in a hamlet to the north. When the former Living Buddha of Muli died, he gave directions as to where his reincarnation might be found. The lamas sallied forth to seek his soul in some infant born about the hour of the late Buddha's demise. They took with them certain of the latter's possessions.

Having found a baby born at the specified time, they displayed the objects. When the child reached for a rosary, this was deemed conclusive proof that the true Living Buddha had been discovered. Thereupon the baby was carried with great pomp to the lamasery, to be worshiped thenceforth by all Muli, even the king.

What joy came to that beggar family! His mother now dwells in comfort in a house outside of Muli, while his father has passed on. The boy's title being "Hutuktu," he lives forever, his eternal existence undergoing occasional diversion through changes of his bodily form.

THE KING IS HOST AT A UNIQUE DINNER

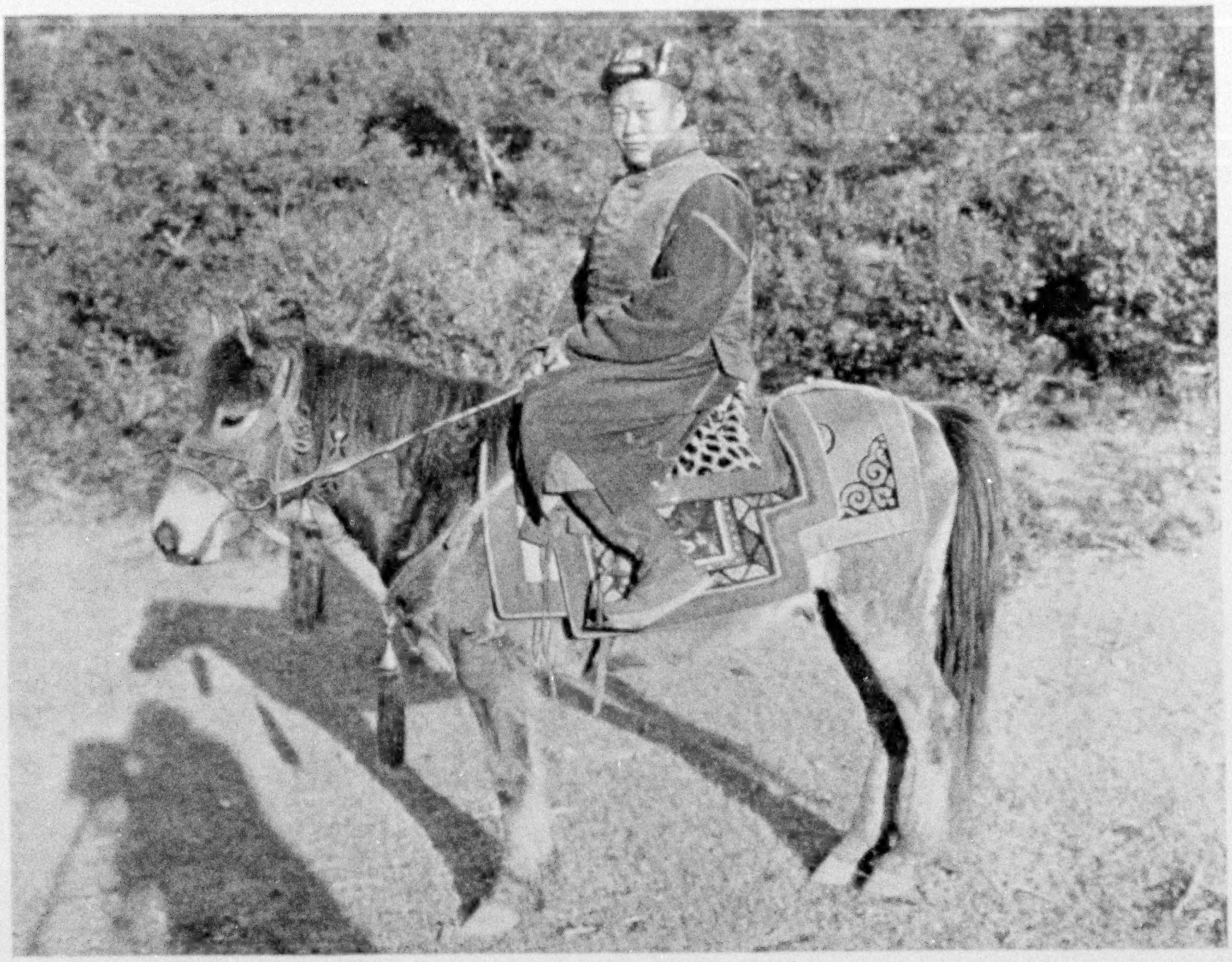
The next afternoon I took dinner with the king. The meal was served in the reception room, on separate tables, before the window, while lamas, including the king's brother, held prayer service in his bedroom.

A steaming iron pot inlaid with silver contained a great array of meats vertically arranged in slices, below which were vegetables of every kind. Rice and several other dishes were served, besides buttered tea gray as mud and of the consistency of soup.

Dessert consisted of a bowl of solid cream. Neither spoons, forks, nor chopsticks were placed beside the bowl. Not knowing Muli table manners, I waited for the king to make the first move. He raised the bowl to his mouth and took one smacking lick. I followed suit. It was the best dish served that day, but, as my tongue was not so agile nor of the proper length, I had to leave a good deal in my bowl.

The lama's secretary, who acted as interpreter, sat humbly on the floor and was not offered any delicacies. He had only buttered tea served in a wooden bowl, while ours were of gold.

After informing me that there would be a great procession of the lamas in front of my house later in the evening, the king arose and remarked that the next day he



THE LAMA KING'S SECRETARY, WHO ACCOMPANIED THE AUTHOR TO SILI

He brought as a parting gift from the king a bag of mandarins and walnuts, and, despite his poverty, presented the leader of the expedition with two brass ladles as a personal token of esteem (see text, page 491).

would go out to pray among the hills, but I was to see him late that evening to say farewell.

THE LAMAS MAKE A CEREMONIAL PROCESSION

I had just arrived at my house at sunset when, from the north gate of the Muli wall, stalked forth the religious procession—some 40 lamas preceded by three boys in armor, wearing helmets and carrying long spears. The first group was followed by four minor lamas with two 12-foot telescopic metal trumpets. The two priests in front held up the instruments to the level of the mouths of the two other lamas, whose cheeks worked like bellows and produced bass notes meant to frighten lurking devils.

Other lamas followed with cymbals, while a fourth section carried trays with red images made of *tsamba* (barley flour) and yak butter, pitchers, and brass vessels. The remaining lamas carried large circular drums, which they struck with curved sticks. Over their red garments they wore yellow cloaks, and on their heads yellow-crested woolen helmets shaped like those of the ancient Greeks.

Just below the rampart of my house a mound of dry oak brush had been erected, and thither marched the lama throng. The last person in line was the Ghiku, a sort of abbot of the monastery. He was more elaborately dressed and carried, or rather dragged, in his hand a long, quadrangular metal staff.

The brushwood pile was now lighted and the images representing devils were thrown into the fire, amid terrific noise of exploding bombs (see page 486).

The ceremony over, and the devils driven into the flames, the procession made its way back to the monastery and night fell over Muli.

Our last day in Muli was a glorious

one, during which I took photographs of the town's prayer wheels. One long row of cylindrical yak-hide wheels stood on the south side of the palace and were let into its wall. They contained miles of paper, tightly wound and covered with prayers of "Om Mani Padme Hum." All monks when passing give each wheel a turn—a most convenient way of saying millions of prayers (see page 479).

Opposite, on the public plaza, there is a small square building, open only for an hour after lunch. It contains a massive wheel, beautifully decorated, rotating on a pivot, and full of prayers. It takes much strength to turn this wheel and it is evidently meant for exercise as well as for praying (see page 478).

At 5 o'clock that afternoon I called upon the king to thank him for his kindness and hospitality. He graciously received me and seemed loath to have me go, saying he hoped I would come again. I was about to leave, when the lord high treasurer entered with a large tray loaded with gifts. Of these I prize most a golden bowl, two Buddhas, and a leopard skin.

His Majesty accompanied me this time not only to the door, but to the stairway, on which had gathered many curious slaves, who flew headlong in fear down the steps at the king's approach.

At the palace gate were assembled the church dignitaries, who escorted me to the big gate of Muli, lined up, and bowed me out.

PARTING GIFTS FROM THE KING OF MULI

We left Muli before sunrise, but took one last ride through the gates of this lama stronghold past the palace. We were met by the lama officials, among them the magistrate and judge, as well as our friend the military chief. They bowed, and we passed out through the south gate into the Muli Valley.

We were soon overtaken by the king's secretary, mounted and accompanied by a Hsifan servant. Despite his poverty, he presented me with two large brass ladles as souvenirs. Then he rode with us as far as Sili, on the other side of the Muli Valley. There he emptied a bag full of mandarins and walnuts, a parting gift from the Muli king (see illustration, page 490).

We proceeded through the wilderness. The mountains were sharply outlined against the sky. In the north was one vast sea of ranges, pink and yellow, with black slopes indicating fir forest interspersed with brown meadows.

Higher and higher we ascended through silent forests. The deep valleys were lined on both sides with snow-capped crags. Little Muli lay on the steep hillside, beautiful in the morning sun, an oak forest surrounding it like a somber garland.

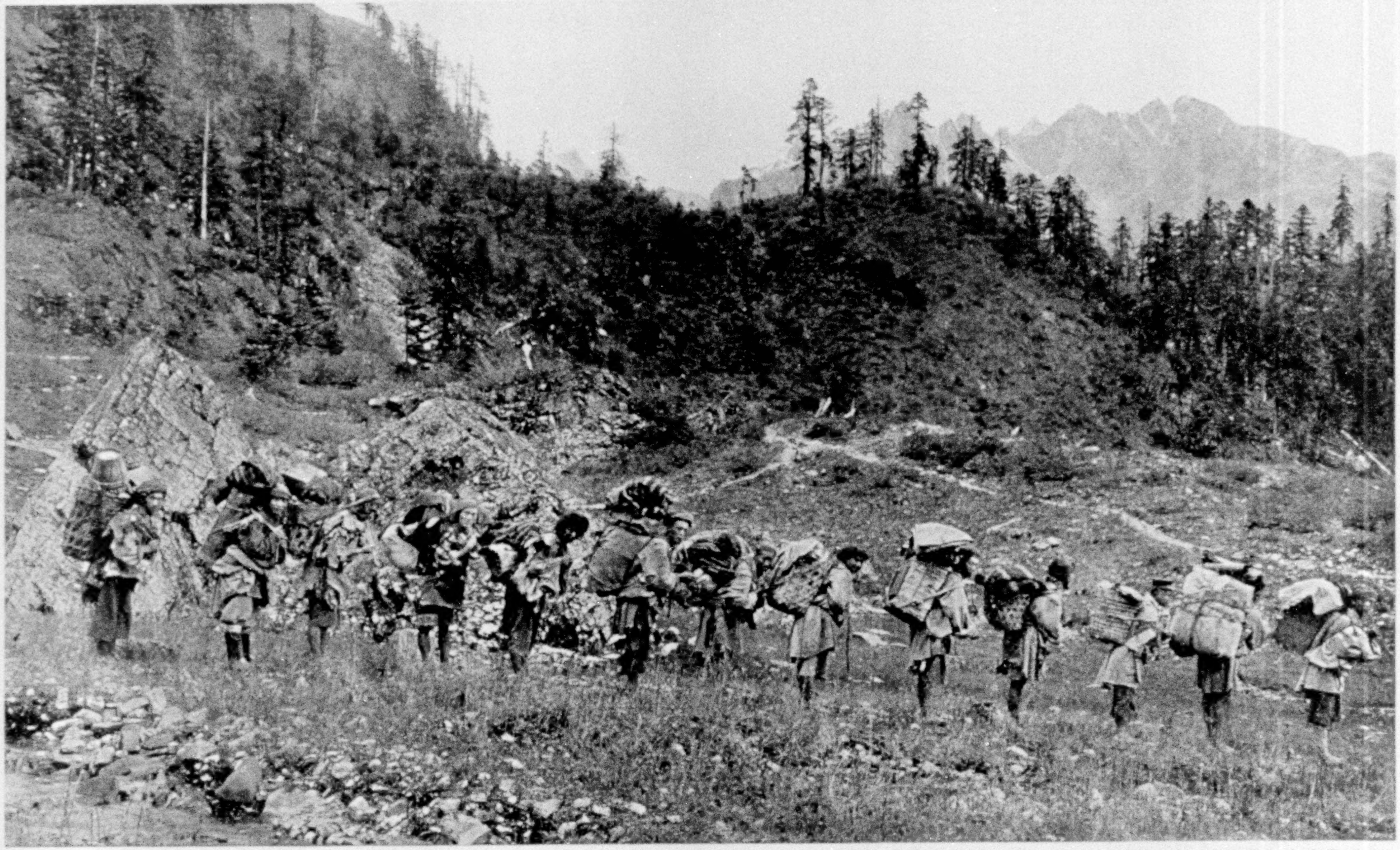
A peculiar loneliness stole into my heart as I rode through the firs draped with long yellowish lichens. I thought of the kindly, primitive friends whom I had just left, living secluded from the world, buried among the mountains, untouched by and ignorant of Western life.

I climbed a ridge and lingered to take a last look at the tiny capital, where I had been received with such extraordinary courtesy and hospitality by its lama sovereign.

Passing through quiet forests of pine and oak, which gave place to spruce and rhododendron higher up, I reached my first camping ground, Agù, at 12,000 feet elevation, in the midst of a fir forest. The king had ordered eight men to go out the day before and prepare camp for us (see illustration, page 487). This kindness was repeated every night while we were in his domain. The balsam fir boughs were so arranged as to form a lovely compound, the fragrant branches covering the frozen ground.

There we pitched our tents and there I let my dreams take me back once more to Muli, that weird fairyland of the mountains, where its gold and riches of the Middle Ages contrast with butter lamps and pine-chip torches.

XUM



Photograph by Joseph F. Rock

TIBETAN, LUTZU, AND NASHI PORTERS OF THE NATIONAL GEOGRAPHIC SOCIETY'S EXPEDITION, AT THE FOOT OF THE SILA PASS, ELEVATION 12,000 FEET, READY FOR THE ASCENT TO THE SUMMIT: NORTHWEST YÜNNAN

THE NATIONAL GEOGRAPHIC SOCIETY'S YÜNNAN PROVINCE EXPEDITION

By Gilbert Grosvenor, LL. D.

President of the National Geographic Society

SINCE the publication of the first of Mr. Joseph F. Rock's articles based on the work of the National Geographic Society's Expedition in Yünnan Province, China,* it has been possible to examine in detail the collections of plants, seeds, birds, and mammals which the leader of the expedition has brought back to the United States.

A brief summary of the achievements of The Society in this field will be of interest to its members.

In February, 1923, the National Geographic Society took over from the U. S. Department of Agriculture the expedition into Yünnan Province, southwest China, headed by Mr. Rock, previously known to readers of the National Geographic Magazine as the agricultural explorer who found, among the hills of Burma, the trees which produce the chaulmoogra-oil seed, a specific for leprosy.

The Society provided Mr. Rock with funds which enabled him greatly to extend the scope of his work in Yünnan, with the result that during the succeeding eighteen months he made researches and explorations which not only have increased our knowledge of a little-known part of China, inhabited by many diverse tribes, but which will materially enrich the flora of the Western World and may, through the discovery of a blight-resistant chestnut, prove of incalculable importance in restoring to American forests one of our most valuable trees.

It was toward the collection of the blight-resistant chestnuts and specimens of other economic plants that the activities of the expedition were mainly directed. Large quantities of chestnuts of apparently immune species were forwarded by registered mail direct to the Department of Agriculture. A fine collection of seeds of coniferous trees, such as spruces, firs, hemlocks, pines, and junipers, was also sent.

* See "Banishing the Devil of Disease Among the Nashi," in the National Geographic Magazine for November, 1924.

Besides these seeds of economic importance, Mr. Rock sent to America numerous rare and promising species of primrose, larkspur, gentian, and other flowering plants.

COLLECTIONS WILL ADD BEAUTY TO GARDENS OF THE WORLD

The expedition's rhododendron collection is the most remarkable ever brought together, including 493 species, or more varieties than had been previously known in America. These, it is believed, will prove of great value to horticulturists throughout the United States, and many new species of this handsome genus of flowering shrubs may be established. They come mainly from the high mountain districts of Yünnan and exhibit wide range in habit of growth and color of flower.

Complete sets of these rhododendrons have been sent as gifts of the National Geographic Society to Kew Gardens at London, to the Royal Botanic Gardens at Edinburgh, and one each to Hon. Vicary Gibbs and Mr. A. K. Bulley, both of England, amateurs who specialize in these plants and whose collections are famous.

In the United States The Society's rhododendrons will soon blossom in Golden Gate Park, San Francisco; in gardens of the Puget Sound region, and in herbariums along the eastern seaboard. Later, when the seeds which have been sown in the Department of Agriculture's greenhouses near Washington have developed into sturdy young plants, further distribution will be made.

Dr. David Fairchild, in charge of the Government's plant importations, reports that Mr. Rock's chestnuts, which include several species heretofore unknown to the horticultural world, and perhaps new even to botanical science, may be used to replace our rapidly disappearing forests of American chestnut. These blight-resistant species are of interest to the tanning industry, which has always depended upon chestnut bark to a great extent, and

XUM

Photograph by Joseph F. Rock

THE SALWIN-IRRAWADDY DIVIDE

The chief work of the National Geographic Society's Expedition was in a region where three of the world's greatest rivers almost converge (see map, page 450), flowing parallel for a short distance, then going their several ways—the Salwin to enter the Indian Ocean, the Mekong to flow into the South China Sea, and the mighty Yangtze to mingle its waters with the distant Yellow Sea, far to the northeast.

Photograph by Joseph F. Rock

THE CAMP OF THE NATIONAL GEOGRAPHIC SOCIETY'S EXPEDITION ON THE SLOPES OF MOUNT DYINALOKO, AT AN ELEVATION OF 13,500 FEET

The plants in the meadow are mostly blue anemones and orchids.

Photograph by Joseph F. Rock

IN THE LOVELY RHODODENDRON FOREST ON A HIGH SPUR LEADING TO THE SUMMIT OF MOUNT GIBÖH, OF THE YANGTZE-YALUNG WATERSHED

The trees are mostly *Rhododendron heliolepis*, *Picea*, and *Quercus semecarpifolia*, besides bushy rhododendrons of various species. The ground is covered with beautiful, rich, green moss. Elevation, 12,000 feet.

which now faces the possibility of its elimination through the ravages of blight.

THE SECRETARY OF AGRICULTURE THANKS THE SOCIETY

The following letter bespeaks the appreciation of the Department of Agriculture to the National Geographic Society for the gifts which nearly a million members of The Society have made possible through their support:

DEPARTMENT OF AGRICULTURE
WASHINGTON, *July* 8, 1924.

DR. GILBERT GROSVENOR,
President, National Geographic Society, Washington, D. C.

MY DEAR DR. GROSVENOR:

I have your letter of June 27, in which you formally present to this Department, on behalf of the National Geographic Society, the seeds collected by Professor Rock in the Province of Yünnan, southwestern China.

It gives me pleasure to express the appreciation of this Department for the service the National Geographic Society has rendered American horticulture in this connection.

At the same time, I desire to compliment Professor Rock on the unusual piece of exploration he has carried out in a remote section of the world, where travel is not only arduous, but at times extremely dangerous.

Members of this Department have followed with interest his wanderings of the last eighteen months, and have particularly marveled at his success in packing and forwarding his collection of seeds to Washington. We know that it is an extremely difficult matter to prepare and dispatch shipments of perishable seeds in a region like Yünnan.

So far as we are aware, not a single packet of the seeds forwarded by Dr. Rock has been lost in transit.

Many thousands of these seeds have germinated, and young plants are growing at our Plant Introduction Garden at Bell, Maryland. In addition, the Department has distributed collections of Professor Rock's rhododendrons and alpines to a number of nurserymen and park superintendents in this country, and to the principal botanic gardens and private plant collections of Great Britain, where it is thought they should succeed.

Your generous financing of the Yünnan Expedition, which enabled Professor Rock greatly to extend the scope of the work, and the coöperative spirit of the arrangement through which it was possible for him not only to send to this Department such seeds as he might collect in the course of his travels, but even to devote much of his time to this work alone, are keenly appreciated.

I hope that many of the plants introduced as a result of this expedition may enrich our national agriculture and horticulture, and that they will stand as a monument to Professor Rock's skill and industry as an explorer, and to the National Geographic Society's public-spirited support of foreign exploration.

Sincerely yours,
(Signed) HENRY C. WALLACE,
Secretary.

NATIONAL MUSEUM IS GIVEN THREE VALUABLE COLLECTIONS

The Expedition's activities were not confined exclusively to gathering seeds, however. Mr. Rock collected some 60,000 sheets of herbarium specimens in the extreme northwest of Yünnan, in Tsarong, southeastern Tibet, in eastern Yünnan, and in the independent lama kingdom of Muli (see preceding pages 447 to 491).

More than 1,600 birds and scores of mammals were also collected, skinned and prepared, and carefully labeled, with notes on the color of eyes, locality, altitude, and date of collection. The birds came from regions where few collections had been made previously, mainly from the high mountain districts of northwest Yünnan, along the Salwin-Mekong divide, on the slopes of the Likiang snow range, and from southwestern Szechwan.

These collections were tendered as a gift from the National Geographic Society to the U. S. National Museum, in the belief that they would prove a valuable addition to our knowledge of the flora and the fauna of this remote region.

The gift has been accepted by Mr. W. de C. Ravenel, in charge of the Museum, who writes:

"It gives me much pleasure to acknowledge the receipt of a collection of approximately 60,000 sheets of plants, about 1,600 birds, and 60 mammals from Yünnan and Szechwan, China, and southeastern Tibet, secured by the National Geographic Society's Expedition under the direction of Mr. J. F. Rock.

"Dr. Leonhard Stejneger, Head Curator of Biology, states that this collection is of unusual interest and value and reflects great credit on the intelligence and industry of the collector. The Museum

Photograph by Joseph F. Rock

THE LEADER OF THE NATIONAL GEOGRAPHIC SOCIETY'S YÜNNAN PROVINCE EXPEDITION ON THE SUMMIT OF TAYIN SHAN

This peak is eight miles from Tengyueh, west Yünnan. The explorer, Mr. Rock, stands beside one of the numerous species of rhododendron, the seed of which he shipped back to the United States.

would be very fortunate if he should continue his explorations and we were given the custody of the material secured.

"Dr. C. W. Richmond, Associate Curator of Birds, states that the bird skins represent by all odds the most important single contribution which has been received by the National Museum from the localities in Asia which are represented and, possibly, from any other part of Asia.

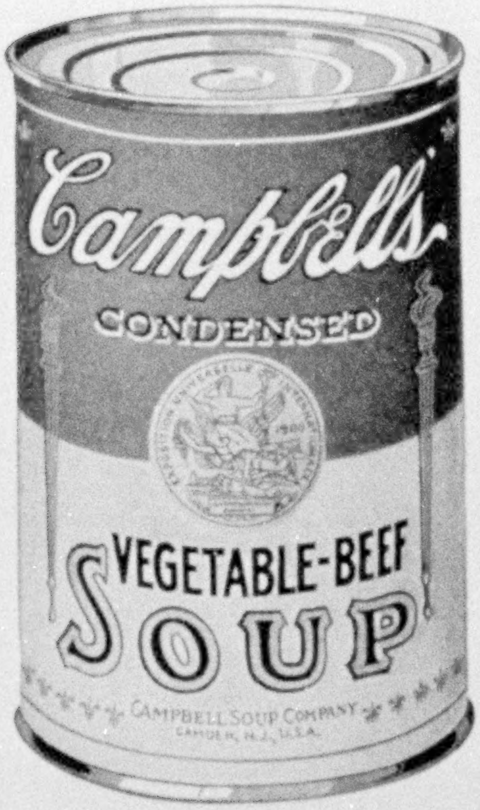
"The specimens are well prepared, fully labeled, and reached the Museum in perfect condition. The ornithologists who unpacked them have no improvements to suggest as to the method employed in packing, preparation, or shipping. Genuine approval was expressed by all who had a hand in the unpacking of the material, especially when it was known that the birds were collected by a botanist who had not received previous training in this work.

"The material contains numerous species of birds new to our collections, and possibly two or more genera not previously represented here, but the full details will not be known for some months.

"I assure you of my sincere thanks for and appreciation of this notable addition to our collections, which is recorded as a gift from the National Geographic Society."

Other illustrated articles by Mr. Rock, describing his adventures while making these collections, will be published in subsequent issues of the NATIONAL GEOGRAPHIC MAGAZINE.

The two most popular hearty soups in America



Do you know how they differ?

Vegetable-Beef

A masterpiece of fine soup blending! Nourishing pieces of beef—a lot of it. Puree of vegetables, tomatoes, diced carrots and white potatoes, little peas, onion and blanched pearl barley. Rich beef broth gives its vigor to the whole blend.

Serve it on toast for breakfast. Make a lunch or supper of it. Have it often for dinner.

Vegetable

You will choose Campbell's Vegetable whenever you wish a substantial soup that combines the largest number of different vegetables—diced, sliced or whole.

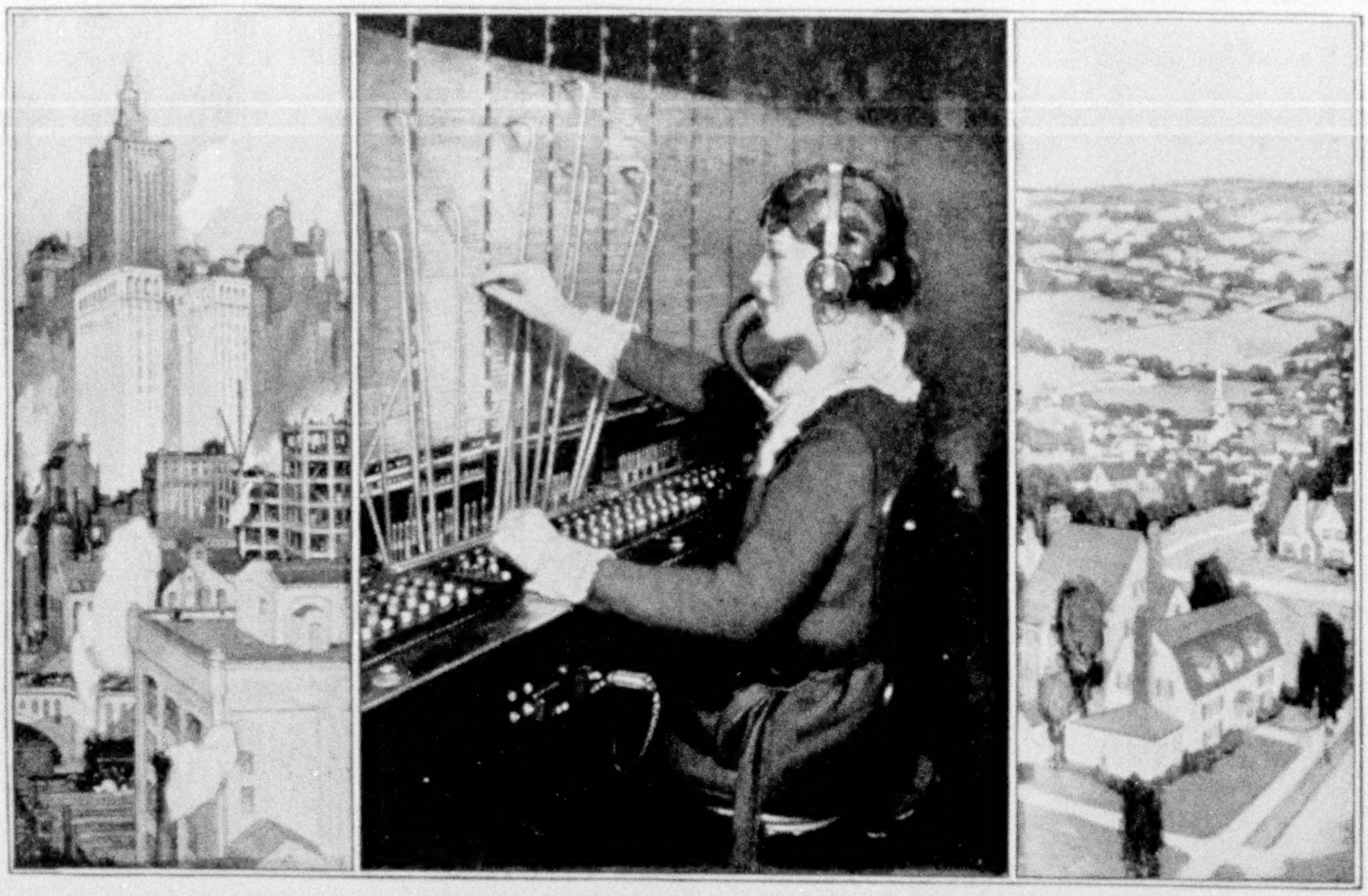
Fifteen different vegetables are in this blend! Beef broth. Cereals. Fresh herbs. Skillful seasoning. Thirty-two ingredients in all! It will prove "exactly right" for you at many and many a meal.

12 cents a can

Campbell's Soups

LOOK FOR THE RED-AND-WHITE LABEL

XUM



At your service

The courteous girl at the switchboard speaks the first word in more than two million conversations an hour. Presiding day and night at the busy intersections of speech, she is always at the call of the nation's homes, farms and offices.

Out of sight, and most of the time out of hearing of the subscribers, little is known of the switchboard girl—of her training and supervision under careful teachers, and of her swift and skilful work. Likewise, little is known of the engineering problems necessary to bring the terminals of fifteen million telephones within the reach of a girl's arm, or of the ceaseless work of maintenance which in fair weather and storm keeps the mechanism fit and the wires open.

America's millions of people must have at their command means of direct and instant communication, and the Bell System must ever be in tune with the demands of national service.

These are the components of America's system of telephony: The best of engineering, of manufacture, of facilities—and a personnel trained and eager to serve.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES

BELL SYSTEM

One Policy, One System, Universal Service

Wider horizons . . . . *through coupons*

Coupons from well secured bonds pay for breathing spells. They broaden the opportunity—to be more, see more, do more. Regular investment in the high-grade bonds we recommend increases the income scope of your funds. Experienced counsel at your service. Offices in more than 50 leading cities.

THE NATIONAL CITY COMPANY

National City Bank Building, New York

BONDS — SHORT TERM NOTES — ACCEPTANCES

Doublecap in use

This stick gives a firm, full-hand hold even when the stick is worn down until it is nothing but a thin wafer.

Holder Top in use

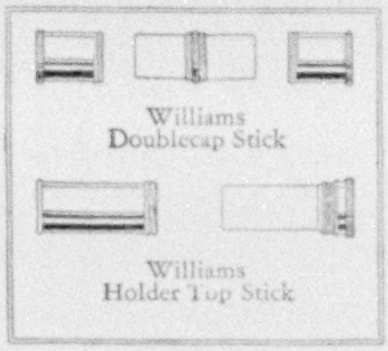
The stick is held by a threaded metal ring —no chance of its working loose. There are reloads for both Williams sticks.

Why we make TWO holders *but* ONE lather

MEN'S tastes vary in shaving stick holders. A man in Kentucky says: "I won't use anything but Williams Holder Top. It has the best holder ever made." A man in Oregon says: "Me for Doublecap. It is the best holder ever made." So we say take your choice.

Here's an open secret: No matter what holder or form of Williams Shaving Soap men buy, *they all get the same famous Williams lather*—and with any kind of water, hard or soft, hot or cold.

Don't expect any other lather to equal Williams.



Perfected by three generations of shaving soap specialists, it stands by itself and stands till you're through shaving! It works up—thick. It holds moisture. It softens the beard—speedily, thoroughly—as only a thick, wet lather can. Williams stick is unusually long-lasting —therefore economical.

We make stick, cream, powder, tablet—four forms; one lather—Williams!

FREE to National Geographic Readers: Send for sample of the new, *scientific* after-shaving preparation—*Aqua Velva.* It protects against wind and cold; keeps the face like velvet.

Williams

Address The J. B. Williams Company, Dept. 54, Glastonbury, Conn.

If you live in Canada, address The J. B. Williams Co. (Canada), Ltd., St. Patrick Street, Montreal

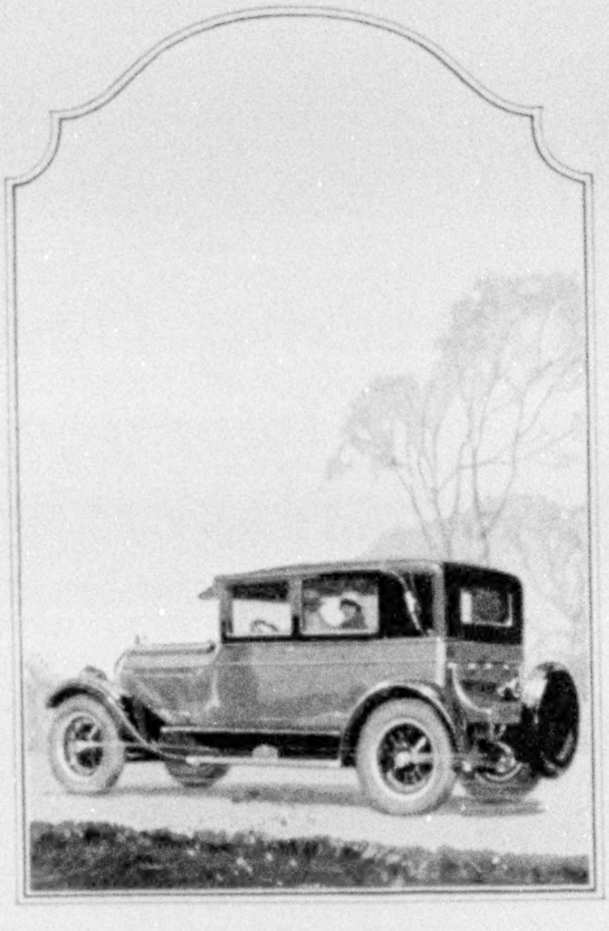
The Car *of the* Present

Before the advent of the Chrysler Six the better cars were on fairly even footing—with practically nothing to distinguish them but price. Public dissatisfaction centered, not on individual cars, but on *all* cars of all types. Chrysler engineers recognized that the uses of the car had outstripped the cars themselves, and that new and fresh enthusiasm would come only when the public was offered a car designed for the purposes of the *present*. Thus the Chrysler organization created an entirely new standard which has had the most profound influence not only upon motor car design, but upon motor car sales. The Chrysler came into being entirely new in the sense that it revealed possibilities of performance, comfort, grace and economy which were never even indicated before. The Chrysler organization gave to motordom refinements that were and are impossible with old methods and old equipment. In the meantime the public response to the Chrysler Six was piling up a tremendous demand. Beyond the slightest doubt, once you experience the thrill of driving a Chrysler, you will never again be satisfied with anything less.

The Touring Car, $1395; The Phaeton, $1495; The Roadster, $1625; The Sedan, $1825; The Royal Coupe, $1895; The Brougham, $1965; The Imperial, $2065; The Crown-Imperial, $2195. All prices f.o.b. Detroit subject to current government tax.

All Chrysler Six models are equipped with special design six-ply, high-speed balloon tires.

There are Chrysler dealers everywhere. All are in position to extend the convenience of time-payments. Ask about Chrysler's attractive plan.



CHRYSLER SIX

CHRYSLER MOTOR CORPORATION
DETROIT, MICHIGAN
Division of Maxwell Motor Corporation

MAXWELL-CHRYSLER MOTOR COMPANY OF CANADA, LIMITED, WINDSOR, ONTARIO

Embodying Three Great Recent Improvements in Tire Building

1. Sprayed Rubber—

Produced from rubber latex by a new scientific method without the use of smoke or chemicals. Pure—uniform—easily vulcanized—of great strength and elasticity.

2. Web-Cord—

A superior cord fabric in which the cords are saturated and webbed together with rubber latex. It contains *no* cross threads to chafe or pull when the tire is in use.

3. Flat Band Building—

Insures a tire that is uniformly strong throughout because every cord bears an equal share of the load.

These three great advances in tire construction were developed, patented and are owned by the United States Rubber Company.

U. S. Royal Cords are made in all regular sizes from 30" x 3½" up, also in Balloon sizes for 20, 21 and 22 inch rims, and Balloon-type sizes for larger rims.

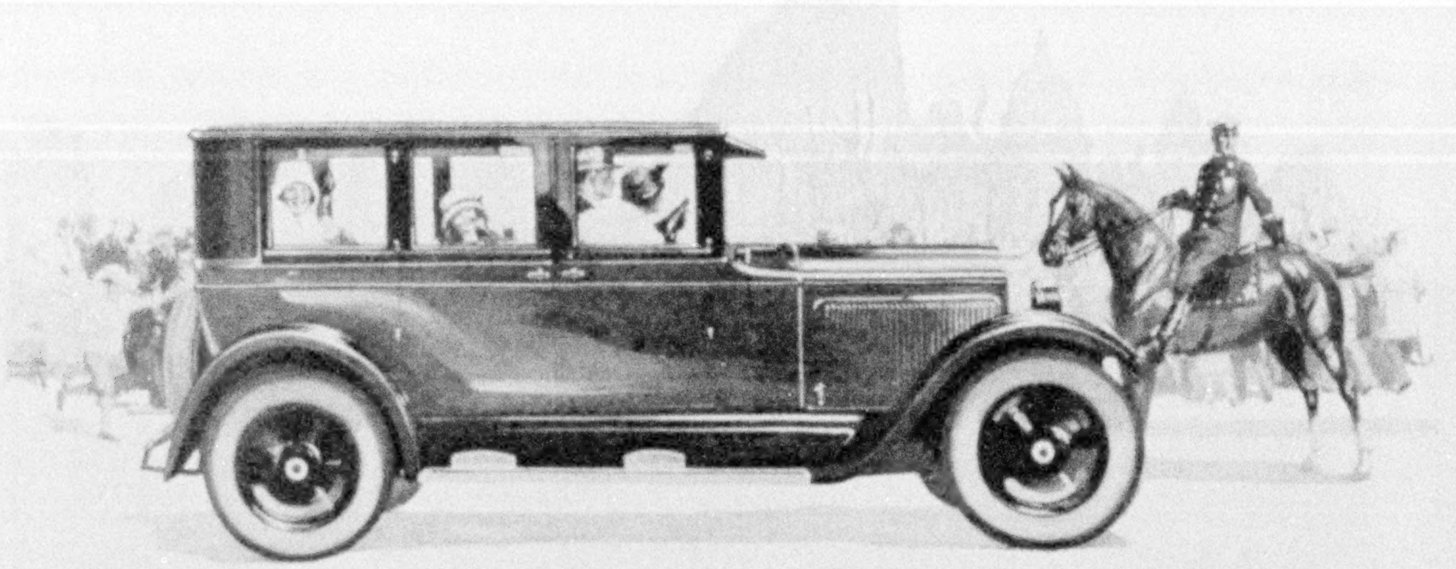
United States Rubber Company

Trade Mark

U.S. Royal Cords

Trade Mark

WILLYS · OVERLAND · FINE · MOTOR · CARS



The *success* of the new Willys-Knight assumes the proportions of a *great* national welcome

There is a great and very definite national movement toward Willys-Knight—the motor car that *owners can keep*, want to keep and *do keep* for years and years.

The Willys-Knight sleeve-valve engine is the *only* type of internal combustion engine that actually *improves with use!* This engine stays young because all moving parts move with a *sliding* or a *rotary* motion—whereas poppet-valve engines have clashing parts in constant concussion . . . This engine does not choke up with carbon—whereas poppet-valve engines do choke up with carbon . . . This engine *never* needs valve-grinding—whereas poppet-valves do need grinding . . . Quiet in the beginning, this engine is even *quieter* after thousands of miles of driving—whereas poppet-valve engines grow *noisier* . . . This engine *gains* power with age—poppet-valve engines *lose* power with age!

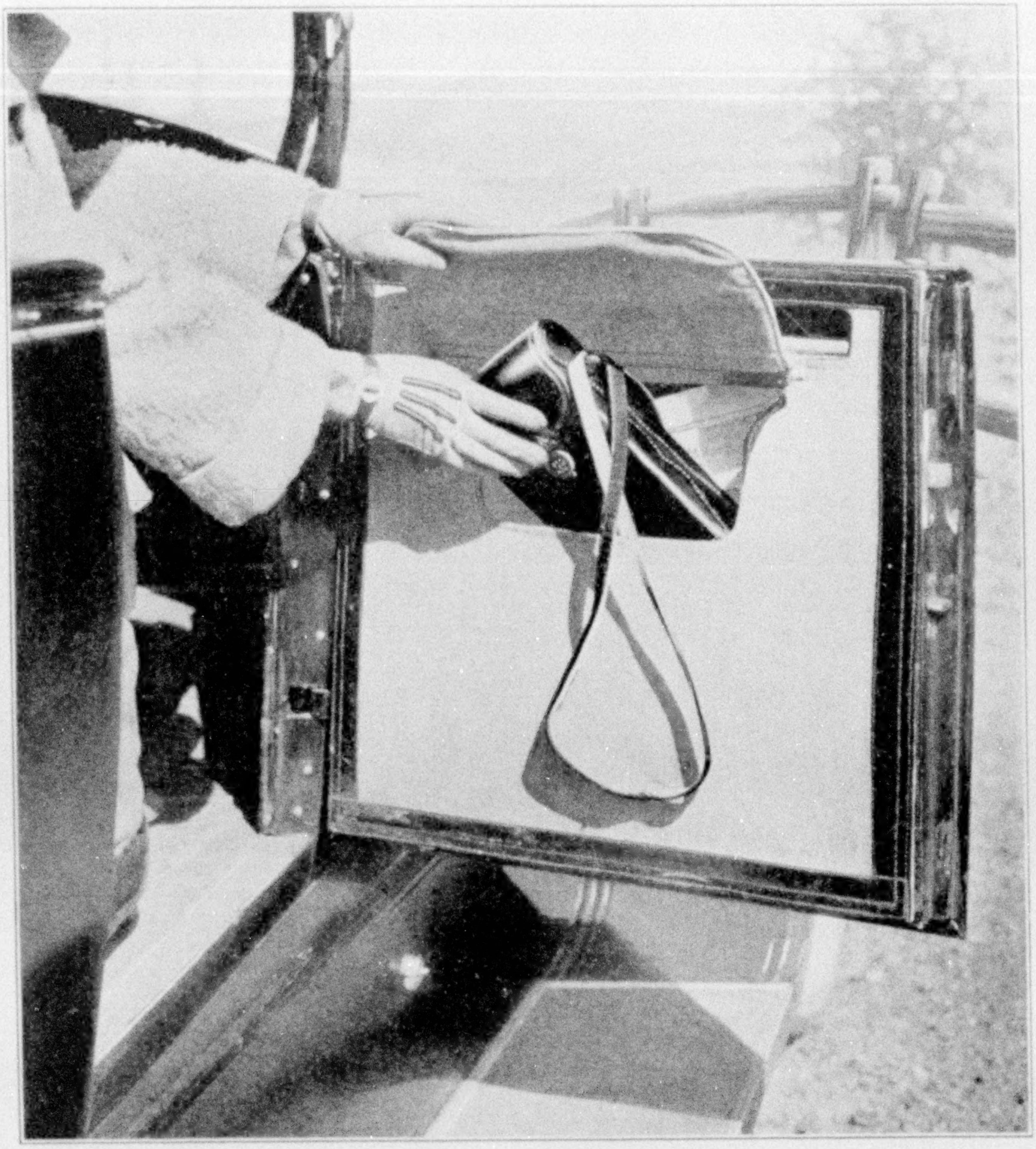
The new Willys-Knight is the *only* car in the United States that is equipped with the great Lanchester Balancer—the celebrated invention which enables Willys-Knight to introduce to the motorists of this country the joys of *vibrationless* motoring. No vibration at any engine speed!

WILLYS-OVERLAND, Inc., Toledo, O.
Willys-Overland Sales Co. Ltd., Toronto, Canada

The Sedan Reduced $200

New WILLYS-KNIGHT

With an Engine you will never wear out



Picture Ahead,

Kodak as you go

Autographic Kodaks $6.50 up

Eastman Kodak Company, Rochester, N.Y., *The Kodak City*

"World's Greatest Buy"

Everyone Says It—Sales Prove It

Hudson is not called "the World's Greatest Buy" for today alone. That is acknowledgment of ten years' constant refinement of a great car around the famous patented Super-Six principle.

The reasons for that position affect all motor-car buying. They cannot be ignored.

A supreme and exclusive motor principle, adding power, smoothness, performance, without added weight, cylinders or cost.

The largest production of 6-cylinder closed cars in the world—and the value advantages of that position.

Actual proof of greatest value—which is SALES.

And now the greatest price advantage with the finest quality Hudson ever offered.

It is only as you find the real comparisons for Hudson qualities among the costliest cars that the enormous difference in price is so astonishing.

All now know that higher price can buy no smoother performance than Hudson's. It cannot buy more brilliant results in pick-up, power or speed. It cannot buy greater reliability or endurance.

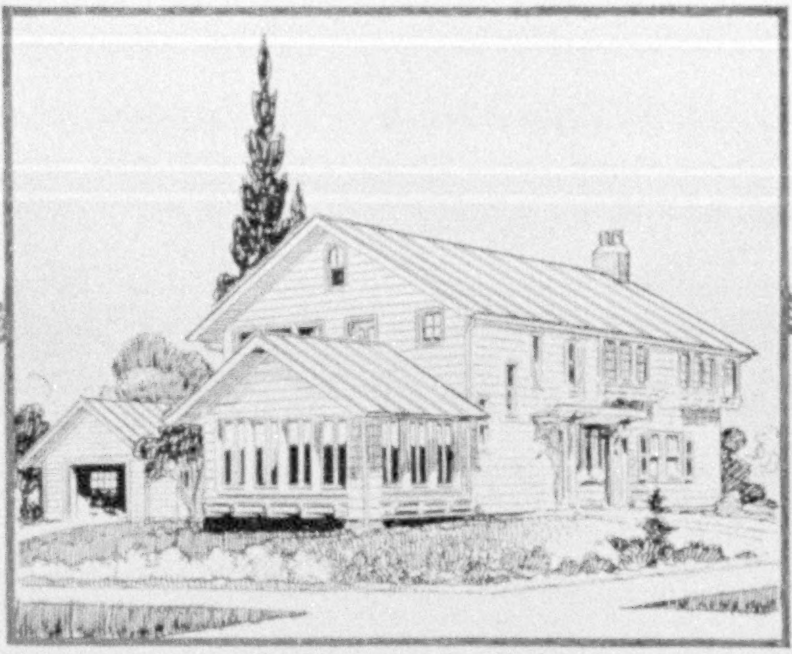
At today's prices need you own a lesser car? Can a costlier car satisfy you more?

HUDSON COACH $1345

5-Passenger Sedan $1795 7-Passenger Sedan $1895

All Prices Freight and Tax Extra

For True Roofing Economy



Use Galvanized Sheet Steel

Safe, Permanent, Attractive

FOR replacement of an old roof or to roof your new home it will pay you to learn the value and economy there is for you in steel roofing.

A steel roof does away with the hazard of "sparks on roofs," one of the most frequent causes of fires. Properly grounded, it gives positive protection from lightning. And it resists the action of sun and rain, heat and cold, dampness and snow, through years of faithful service.

Because it combines great strength with light weight, steel roofing does not necessitate the heavy structural supports required for other roofing materials, and therefore it makes possible a reduction in building cost.

Steel roofs never rot, warp or become mossy or mildewed. The rain and wind keep them clean. Gutters and down spouts are not clogged with dirt and mould. Cistern water from a steel roof is free from dirt.

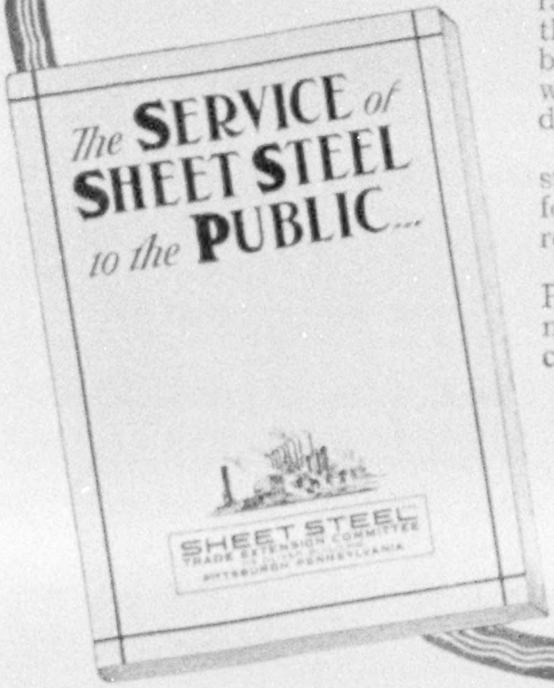
The ease with which sheet steel is formed and fabricated makes it adaptable for all forms of architectural construction. It can be painted any desired color, and at any time a fresh coat of paint will make it new again.

Conclusive evidence of the economy, efficiency and durability of steel roofing is to be found in the experience of the great railroad systems of the country, which have never been able to find any material to compete with it for uses where strength with light weight, economy and long and durable service are demanded.

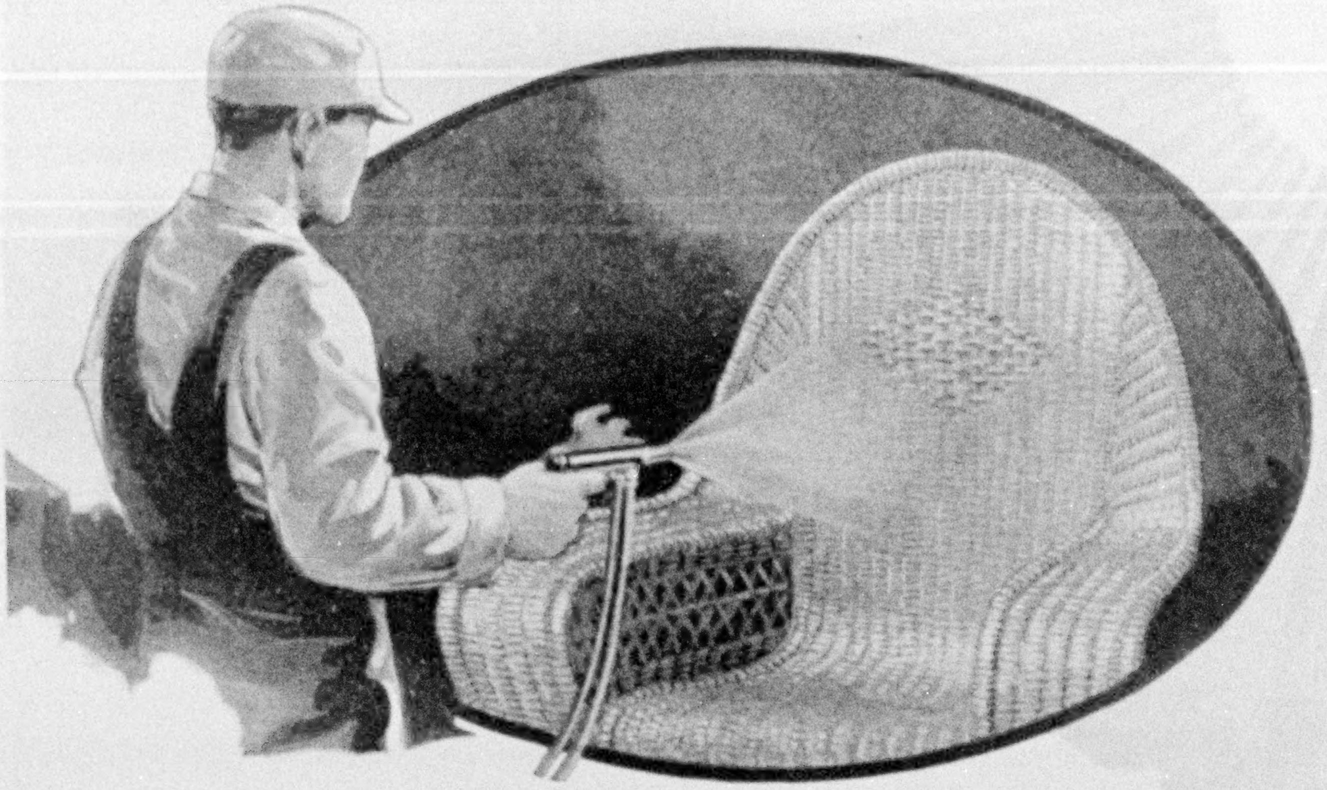
Sheet steel also has many advantages for interior construction. For example, in the form of metal lath as a base for plaster, it prevents cracking and provides a highly fire-resistive construction.

Ask for free booklet, "The Service of Sheet Steel to the Public." It will show you many ways that probably have never occurred to you in which sheet steel and its products can serve and save for you.

Ask for this Booklet



SHEET STEEL
TRADE EXTENSION COMMITTEE
715 OLIVER BUILDING
PITTSBURGH PENNSYLVANIA



Strength of fibre—beauty of willow

This manufacturer now knows that our paint and varnish technical staff can assist any manufacturer

WITH all the beauty of willow, every strand of this woven chair is strong, enduring, uniform manufactured fibre.

This manufacturer, like two thousand of the largest, most successful concerns in America, sought the co-operation of our Paint and Varnish Engineering Service—the same service that is available to any manufacturer.

Pittsburgh
Proof
Products
Glass-Paint-Varnish-Brushes

No matter what your product—it is probable that this organization has made a scientific study of the finishing of the same or similar products and is ready to bring this specialized, practical experience together with the laboratory resources and the knowledge of paint and varnish manufacturing to bear on the improvement of finishing-room methods and results.

In countless instances, this Paint and Varnish Engineering Service has been successful in cutting finishing costs, increasing production, eliminating trouble and improving the salability and service of the product.

This is a free service of co-operation to responsible manufacturers. There are Engineering representatives in all principal cities to consult with you. As one responsible manufacturer to another, write us for details. Address Dept. C today.

PITTSBURGH PLATE GLASS CO.

Paint and Varnish Factories .... Milwaukee, Wis., Newark, N.J., Portland, Ore.

This Father is Worthy of Their Trust

A wonderful man, our Father! He comes home at night out of the great world, his pockets full of bright pennies, his rough coat smelling of cigars. He smiles at us from the head of the table as he carves the meat, and we smile at him and at mother, because he takes care of us all. We climb over him after he has his slippers on, and tell him about our work at school. He makes things out of wood. He is so strong he can carry all of us upstairs at once. The dog rests his head upon his knee. There is no man in the world like our Father!

Right you are, children. Father's care of you will go on right through all of your lives—clear through the time when little Joan has grown up from babyhood to womanhood. And do you know how Father has done this? He did it through the big Prudential Insurance Company, which is arranging a monthly income with many fathers every day.

You are right, children. *Your* Father is worthy of your trust.

What Are Prudential Monthly Income Policies?

While men are young they can provide for their old age While they live they can provide for those who depend upon them and who would suffer when they are no longer with them. The Prudential Monthly Income Policy pays a monthly income for any selected period of years or for a whole lifetime, as steady and sure as the Rock of Gibraltar. Ask any Prudential agent or write us.

The
PRUDENTIAL
INSURANCE COMPANY OF AMERICA

Edward D. Duffield, President *Home Office, Newark, New Jersey*

Vladimir de Pachmann *loves* the Baldwin piano. Through the medium of Baldwin tone, this most lyric of contemporary pianists discovers complete revealment of his musical dreams. For a generation de Pachmann has played the Baldwin; on the concert stage and in his home. That loveliness and purity of tone which appeals to de Pachmann and to every exacting musician is found in all Baldwins; alike in the Concert Grand, in the smaller Grands, in the Uprights. The history of the Baldwin is the history of an ideal.

". . . . It cries when I feel like crying, it sings joyfully when I feel like singing. It responds—like a human being—to every mood. I love the Baldwin Piano."

V. de Pachmann.

Baldwin

A request by mail to the nearest Baldwin show rooms, as listed below, will bring you complete information regarding models and prices.

THE BALDWIN PIANO COMPANY

Cincinnati Chicago New York Indianapolis Louisville St. Louis Denver San Francisco Dallas

Qualified men and women who desire the advantages of University training, but who find it necessary to study at home, will be accepted by

Columbia University

for enrollment in

Home Study Courses

Through its Home Study Courses, Columbia offers genuine University education to anyone, anywhere, who feels a sincere desire for self-improvement and cultural study. Columbia Home Study Courses offer, by mail, the personal guidance of regular University teachers, who give instruction strictly up to University standards, guiding the student's progress, correcting his papers, offering constructive criticism, adapting the course to his particular needs.

A wide range of subjects is covered in the courses now available. A few are listed below. Check the one in which you are interested and mail the coupon, or ask for the Bulletin of Information on all Columbia Home Study Courses.

Write to the University for Full Information

COLUMBIA UNIVERSITY,
Home Study Department,
New York, N. Y.

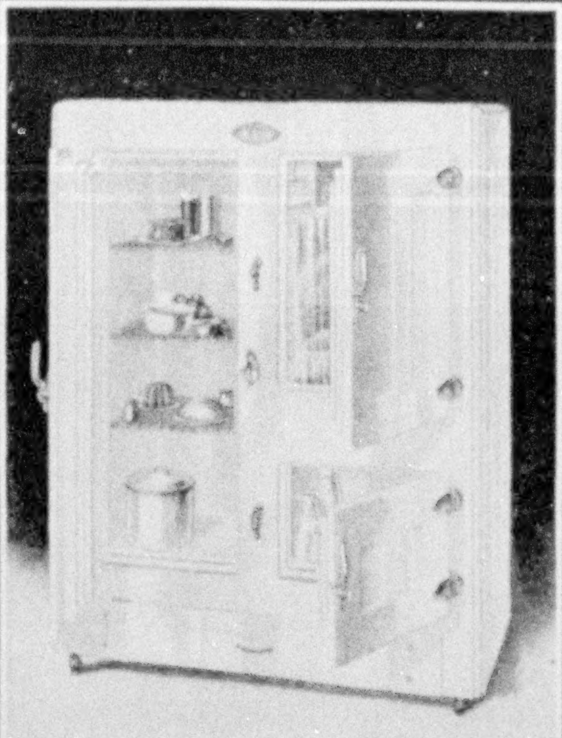
Please send me full information about the Columbia Home Study Course checked below. (Geographic, 4-25)

- ☐ English Composition
- ☐ Short-story Writing
- ☐ French
- ☐ Spanish
- ☐ Greek
- ☐ Latin
- ☐ Psychology
- ☐ Accounting
- ☐ Mathematics
- ☐ Economics
- ☐ Banking
- ☐ Religion
- ☐ Send me Bulletin of Home Study Courses

Name..

Address..

Occupation..



Genuine Porcelain Enamel Inside and Outside

BOHN
SYPHON REFRIGERATOR

The ability to preserve in wholesome goodness, even most perishable foods, is found in a superlative degree in this new BOHN syphon refrigerator. ¶ The clean lustre of crystal-white porcelain, inside and out, combined with the efficient BOHN syphon system, assures the modern housewife of healthful refrigeration.

Adopted by the Pullman Company; every dining car on all railroads is equipped with BOHN SYPHON REFRIGERATORS and is a rolling testimonial of unsurpassed efficiency.

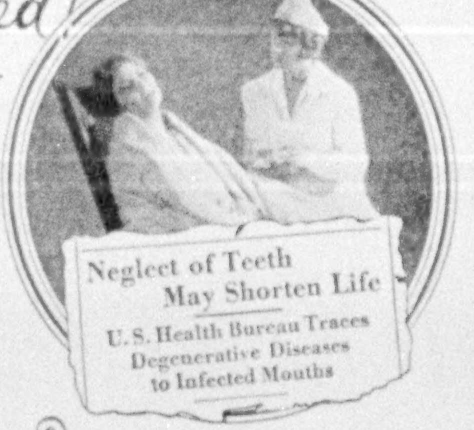
Bohn Refrigerator Company
Saint Paul, Minnesota

Retail Salesrooms in the following cities:

New York—5 East 46th Street
Boston—246 Boylston Street
Chicago—Washington Street and Garland Court

This might have been prevented!

Result of neglected teeth



For the Sake of Beauty and Health

Use Colgate's

It *removes causes* of tooth decay

These pretty girls know how to care for their teeth

SCIENCE proves that many dread diseases are traceable to tooth decay. Because of this, preventive dentistry is sweeping the United States. Dentists everywhere are interested in this modern move to prevent tooth trouble and thus prevent much sickness.

Delay May Mean Decay

The time to fight tooth trouble is before it starts. Delay is dangerous, for modern foods are soft, likely to start unhealthy conditions that may become far advanced without the slightest warning. Don't wait for aches and pains to tell you. Don't wait until good looks are gone.

Colgate's Is Safe and Effective

Colgate's Ribbon Dental Cream is a modern dentifrice—widely recommended by modern dentists. It "washes" your teeth thoroughly clean—does not scratch or scour them. The combined action of its soap and chalk gently removes clinging food particles. Causes of tooth decay are thus safely and effectively removed by Colgate's. It is safe for a lifetime.

The Safe Course of Treatment

Take good care of your teeth and they will take good care of you. Brush them after each meal. No matter what kind of tooth brush you like, use Colgate's with it. The taste of Colgate's is pleasant. It is made sensibly, advertised sensibly, and is sold at a sensible price, 25c. for a large size tube.

Consult your dentist twice a year. It pays.

HUMAN LIFE is often shortened from five to ten years by so-called degenerative diseases—rheumatism, heart disease, kidney trouble and other ailments.

The U. S. Public Health Service says:

> "Neglect of the teeth in early life usually means an infected mouth and abscesses at the roots of the teeth which, unless cared for, persist in later life. Such abscesses may act as reservoirs of infectious material which may enter the blood stream and be carried to the remote parts of the body, frequently causing rheumatism, heart disease, kidney trouble, and other ailments which may materially shorten life."

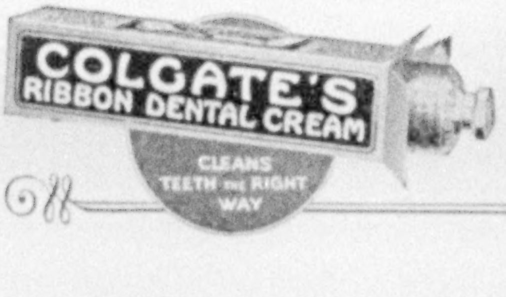
Mental development, as well as physical, often depends on the teeth. Dr. John J. Cronin, of the Bureau of Child Hygiene, Department of Education, New York City, traces 94% of absences among school children to toothache and other dental ailments. This means retarded mental development.

Even insanity can be caused by dental disorders. Dr. Henry A. Cotton, Director of the N. J. State Hospital for the Insane, declares decayed teeth are a chronic cause of this dread affliction.

Preventive dentistry and observance of simple rules of health mean better health and more happiness for the whole human race.

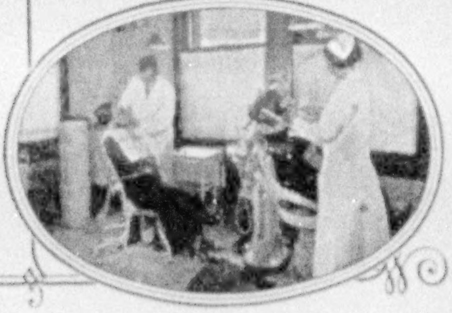
Give yourself a chance!

How the employees of the N. Y. Telephone Company are given a chance to escape disease. Illustrated below is a corner in the dental clinic the company maintains.



COLGATE & CO.

Established 1806



XUM

Four Weeks in France At the Cost of An Ordinary Vacation

A GOLDEN noon under striped umbrellas—chicken en casserole fit for a prince and his court . . . Barbizon. A million jewels in the air, tossed against the sky—the spirit of history in lovely and stately rooms—gardens that make you dream of the long ago—Versailles, with the fountains playing. Moonrise from Sacre-Coeur. Twilight in the Bois.

The Riviera with summer prices—jeweled with little red roofed towns and sparkling beaches, where every turn provides a never-to-be-forgotten view. The French Alps, the Pyrenees, are accessible by means of wonderful motor roads.

You can go to France this summer for $140.00, in the large French Line one-cabin liners. You can even make a round trip for $162.00—tourist III class, with individual rooms . . . You can live well in France—and tour—on six dollars a day . . . Write for booklet.

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Agencies in Principal Cities of the United States

SWITZERLAND

Go there this Summer but GO RIGHT

To those making their first trip to Switzerland, the *Official Agency of the Swiss Federal Railroads*, in New York, desires to be of special service. It aims to give full and accurate information. It has for distribution the individual booklets of practically all resorts in Switzerland, also maps, guide books, transportation time-tables, etc., etc. Its services are free and gladly given to all Americans going to Switzerland.

Wouldn't you like to go to Geneva, the world's peace capital, ever attractive for its beauty, wealth and intellect; to enjoy the delights of distinguished Lausanne-Ouchy, an international center for education, and the mingled city and peasant life in Berne, the quaintest and most charming diplomatic city of Europe?

You will travel in luxuriously equipped electric trains—via the Loetschberg route, for instance—to the kaleidoscopic Bernese Oberland; and be a part of the fascinating life at its many gay resorts, particularly at the garden spots of Thun, Kandersteg-Gstaad and Interlaken. The glacier beauties and pastoral life at Grindelwald and Wengen, the thrills of the Jungfrau Railway to the top of the world, with the many side trips above cloudland to the Schynige Platte and Murren, will last forever.

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Or the Grisons, with its hundreds of snow-capped peaks and blossoming valleys and its famous St. Moritz to add to your never-to-be-forgotten vacation in Switzerland.

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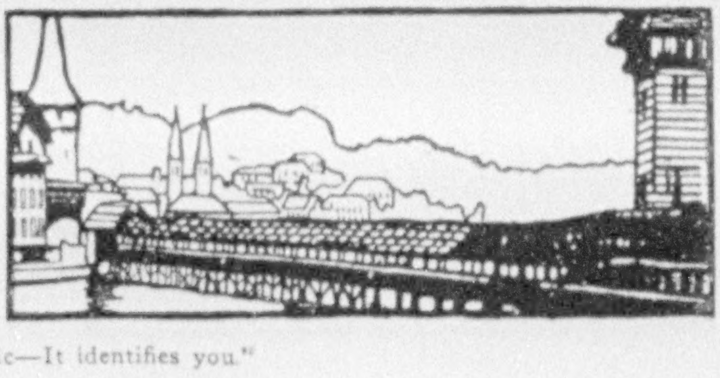

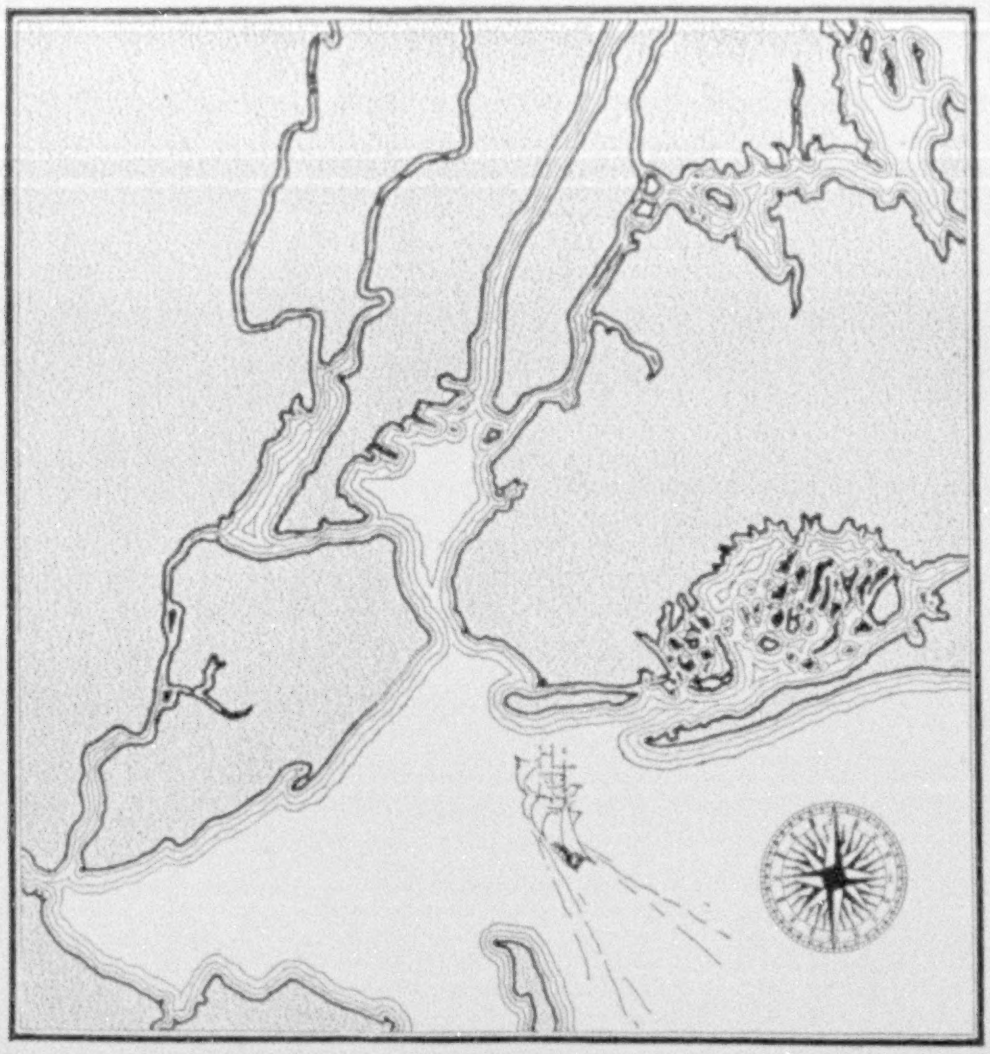

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Can you recognize it? It is one of the best known places in the world. Millions of people enter it and leave it yearly. Thousands of ships use its harbor. Its name is continually in the newspapers.

From this bare shape you can probably tell that this is the harbor of New York. But what does this map, absolutely accurate as it is, mean to you? Very little, if anything! To be useful a map must be more than an exact picture of the contours of the earth. It must be able to give you at a glance whatever information you may need about a place—about its people—about its history. . . .

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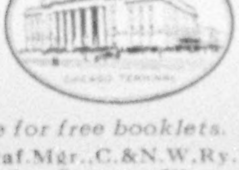

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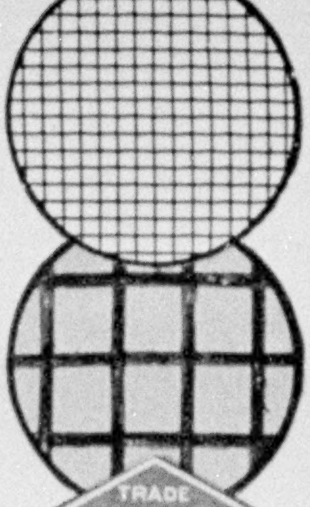

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Add another room to your house this summer. Turn your porch into an out-door living room. Screen it properly and there will be no flies to disturb a luncheon or afternoon tea—no mosquitoes to drive you indoors on a hot evening.

By using Jersey Copper Screen Cloth, 16 mesh, you obtain a maximum of protection from annoying, disease-carrying insects. This is a true insect screen cloth for it bars not only flies but mosquitoes and other small trouble-makers.

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In the upper circle is shown an unretouched photograph, actual size of Copper Screen Cloth (heavy grade) made by The New Jersey Wire Cloth Company, which has been subjected to the action of salt air for more than twelve years.

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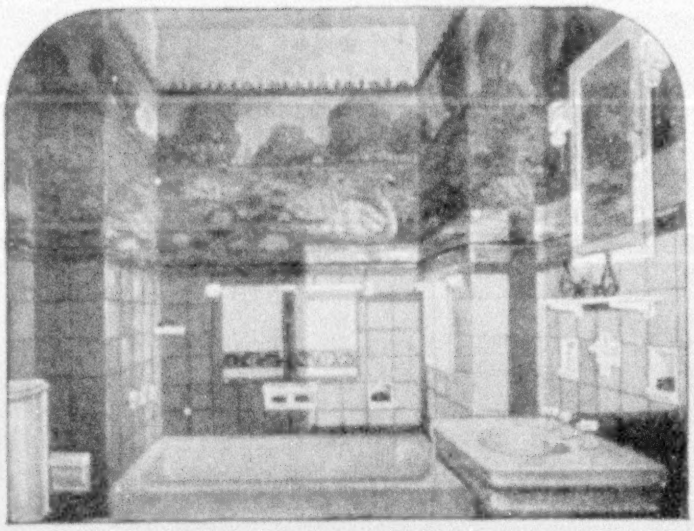

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But be certain you have the kind of beauty that will last

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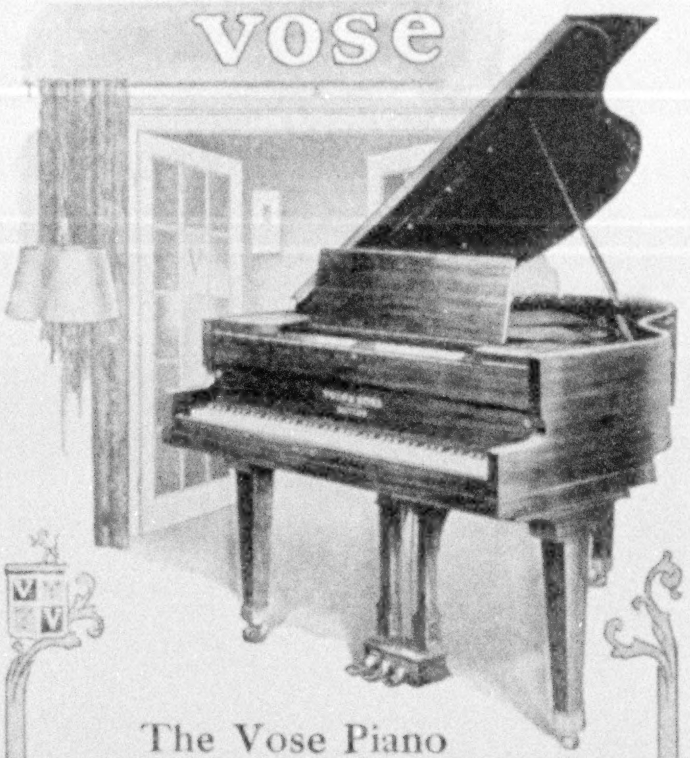

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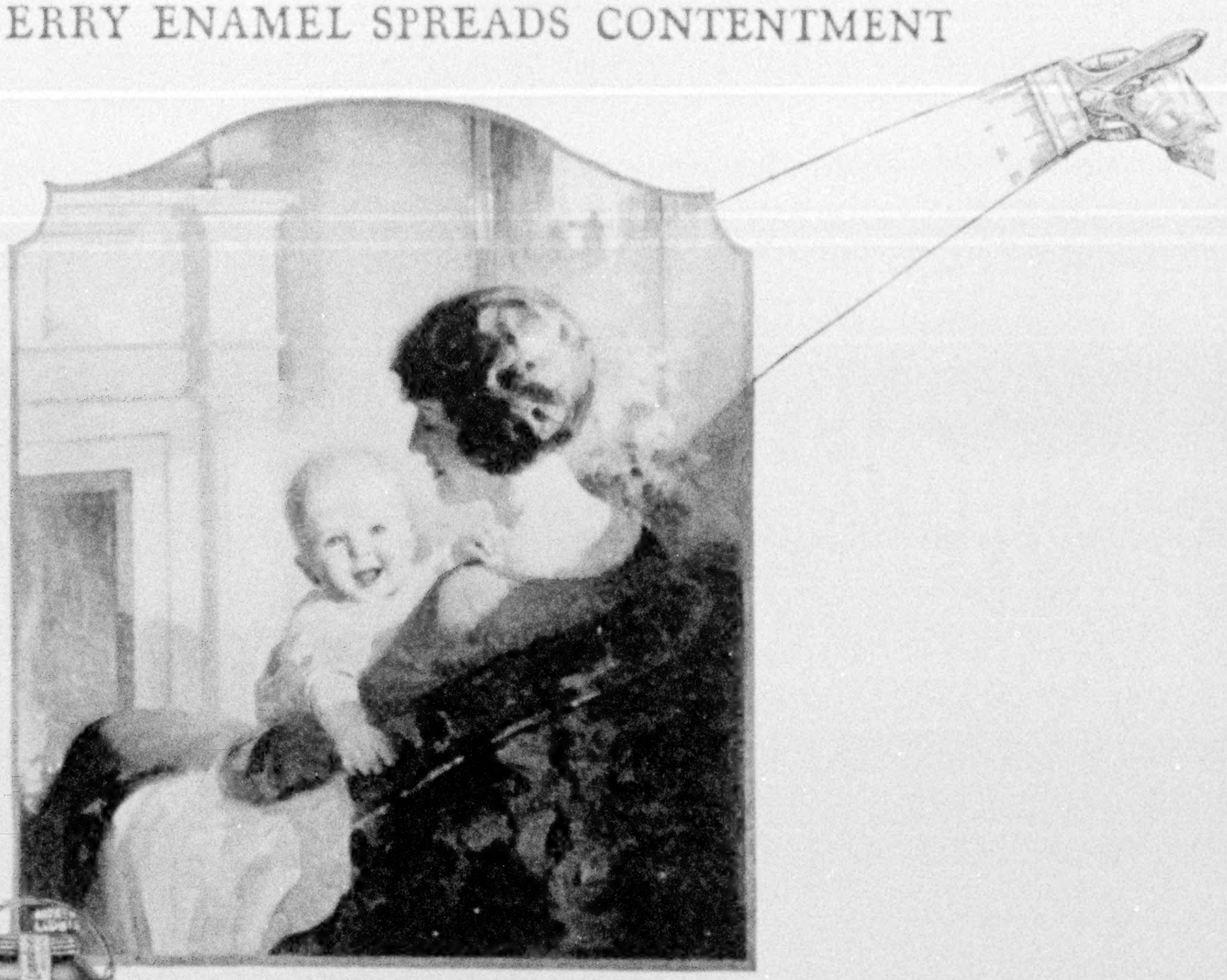

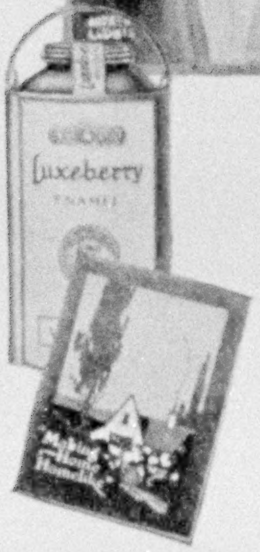

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These two enamels, guaranteed by the maker of Liquid Granite Floor Varnish, are unequalled for their purposes. It will pay you to demand them.

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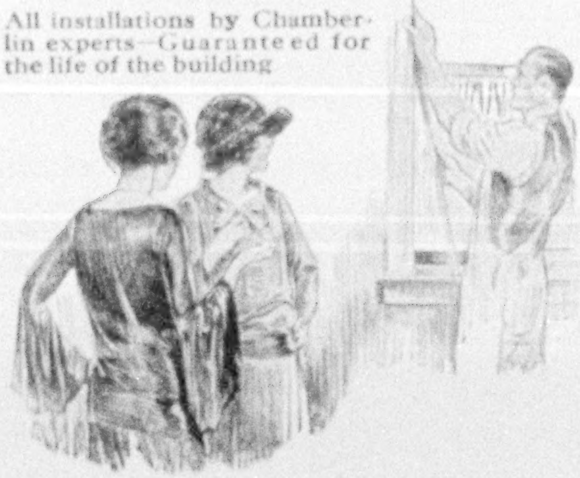

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Chamberlin Metal Weather Strips—In my home—Office Bldg.—Church—Number of Windows—Number of Doors—

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*City and State*____________________

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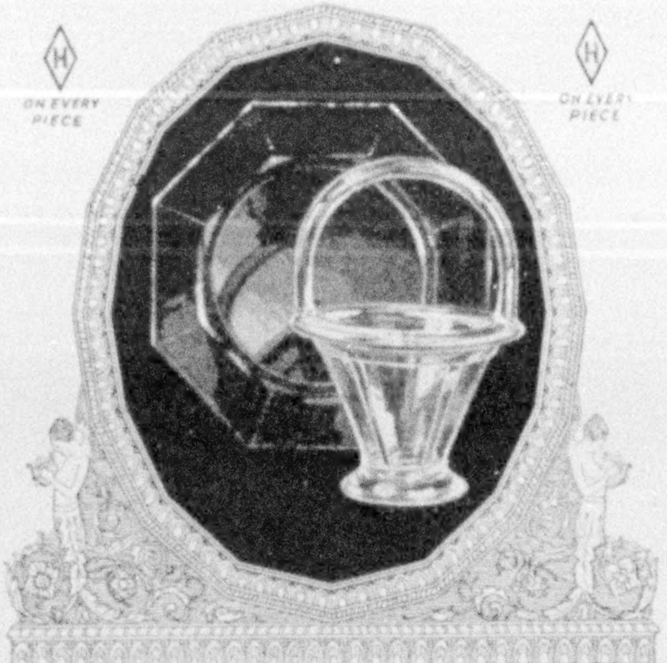

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An Ideal Power Lawn Mower does far more than merely cut the grass. In the same operation it rolls the lawn to a park-like smoothness and greatly retards the ravages of worms and other pests.

One man with an Ideal will do the work of five men with hand mowers. Any unskilled man can operate it. It quickly pays for itself, even on lawns of an acre or less.

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Reservations now available for personally conducted Alaskan Vacation Tour, party of twenty, leaving Chicago July 11. Return from Portland, Ore., by any route with stop-overs anywhere. Membership in this party will appeal to those who are accustomed to the best in travel accommodations. References exchanged. For particulars, address—

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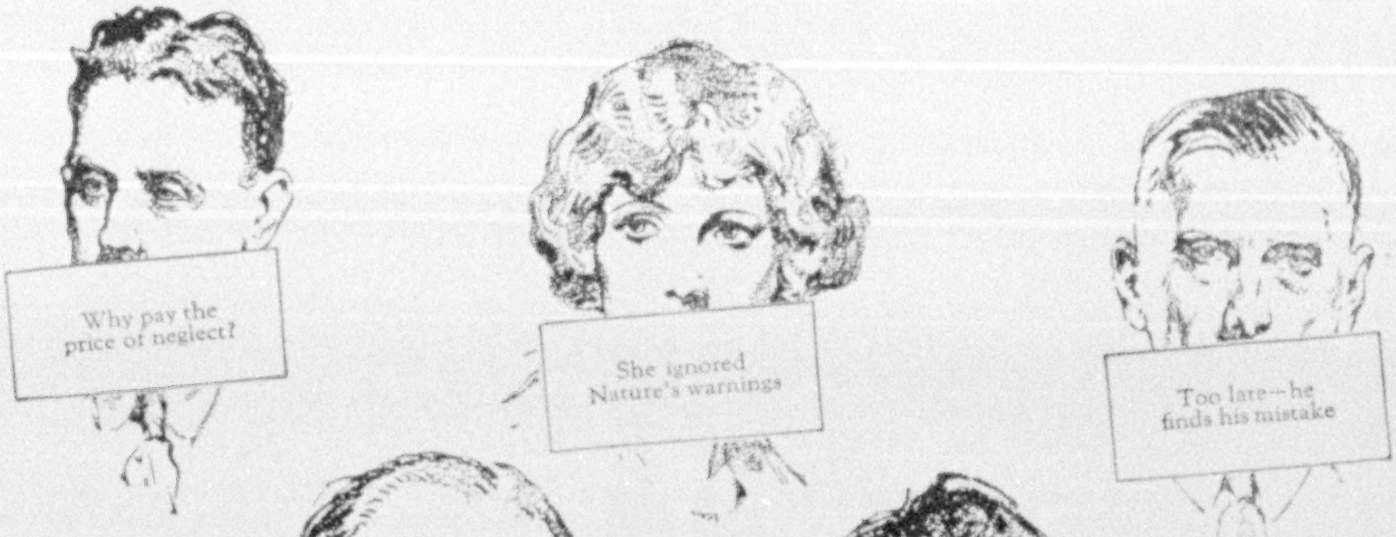

4 out of 5

Dental statistics prove that four out of every five over 40—as well as thousands younger—pay Pyorrhea's toll. Do you want to elude this dread disease?

Your teeth are only as healthy as your gums

The gums are the keys to health. You must keep them firm, strong and healthy or your teeth will begin to loosen and eventually come out. This is one of the penalties of Pyorrhea.

But there are others even worse. Pus pockets form and generate poisons that drain through the whole system, often causing diseases so prevalent in middle life.

Don't wait for tender, bleeding gums to warn you of Pyorrhea. Ward it off by going to your dentist regularly and using Forhan's For the Gums twice a day.

This safe, efficient, pleasant-tasting dentifrice counteracts the effects of harmful bacteria, hardens soft, tender gums, keeps them sound, firm and pink. Furthermore, it cleans and whitens the teeth and keeps the mouth fresh, clean and wholesome.

Even if you don't care to discontinue the dentifrice you are now using, at least start brushing your gums and teeth once a day with Forhan's.

It is a preparation of proved efficacy in the treatment of Pyorrhea. It is the one that many thousands have found beneficial for years. For your own sake, make sure that you get it. Ask for, and insist upon, Forhan's For the Gums. At all druggists, 35c and 60c.

Formula of R. J. Forhan, D. D. S.
Forhan Company, New York

Forhan's
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A Garden Full of Dahlias for $3.50

New and Rare Exhibition Dahlias

Few flowers, whether used for garden decoration or principally for cut blooms to decorate the home, are as responsive to simple garden culture as our Modern Dahlia. It has made wonderful advancement in size of bloom, habit of growth, and profuse blooming qualities.

In order to further its now great popularity, we are offering this collection of

12 Dahlia Tubers for $3.50

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Order Your Tubers Now so as to have them ready to plant any time after the tenth of May or when all danger of frost is past.

Mail this advertisement with check, money order, cash, or stamps, and secure this exceptional collection, sent prepaid to any point in the United States.

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The Sign of the World's Standard Piano Action

What *Piano* Action Has the Instrument?

WISE buyers are making the *piano* action the *determining factor* in selecting a piano, player, or reproducing piano. They realize that tone and touch are controlled by the *piano* action and, further, that the durability of the instrument is largely dependent upon this wonderful mechanism.

Let your first question be: "What *piano* action has the instrument?" If it is the Wessell, Nickel & Gross action, you are bound to obtain a worthy instrument, for this famous action is found only in pianos and players of proven excellence.

Your piano merchant knows that the Wessell, Nickel & Gross action has stood the test of 50 years and that it is recognized as a product of merited distinction. It is the *highest-priced piano action built today* and Wessell, Nickel & Gross are the oldest, largest, and leading makers of high-grade piano actions.

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When you Buy an Upright, Grand, Player or Reproducing Piano—Insist on the Wessell, Nickel & Gross Piano Action.

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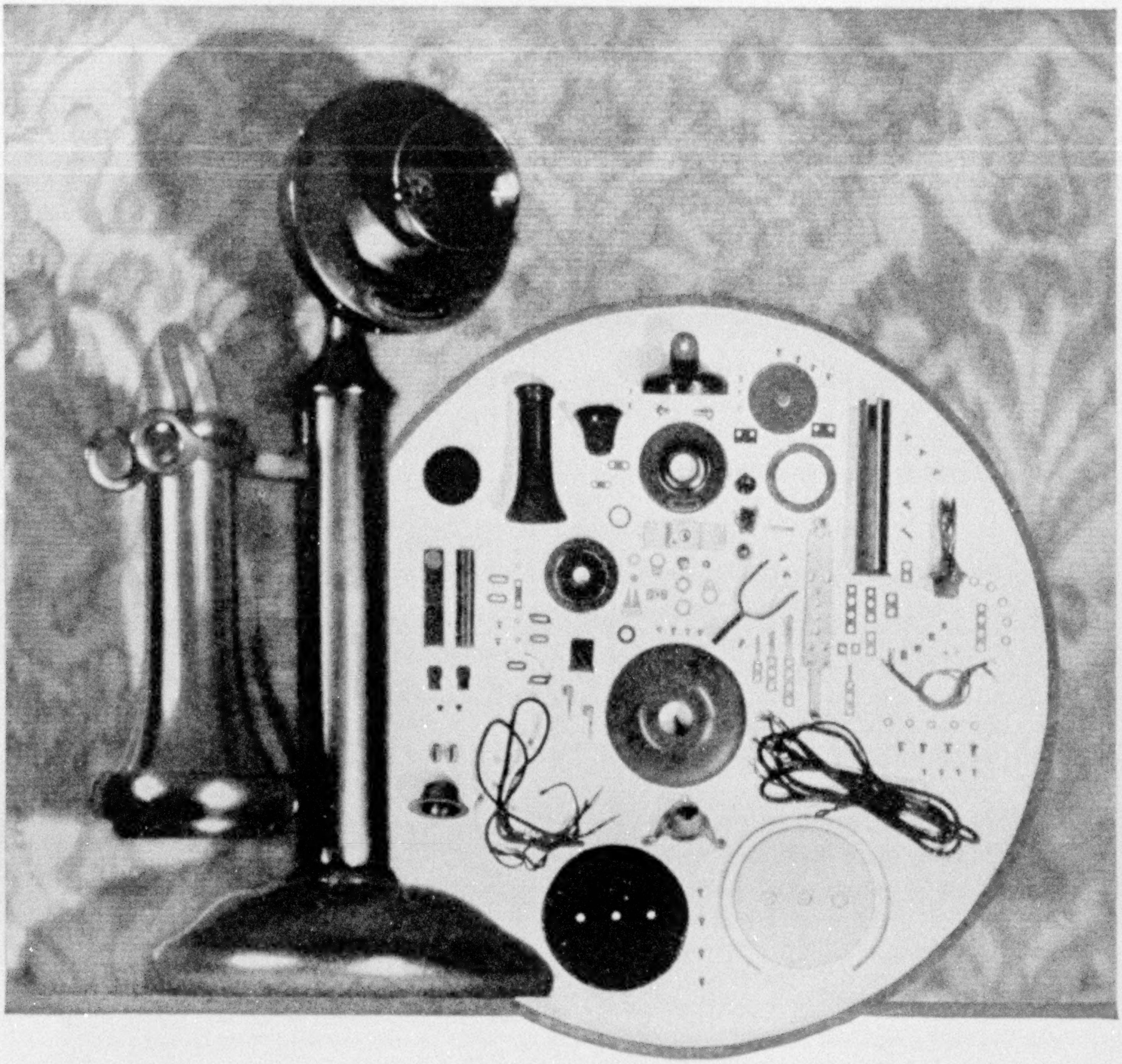
for membership in the Society.

Name and Address of Nominating Member

4-25



Not so simple as it looks

Your telephone is made up of 201 parts, every one of which had to be planned, produced and assembled with an unusual degree of accuracy.

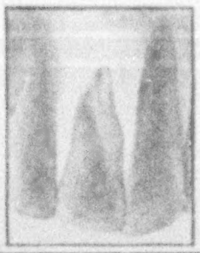
Such multiplicity of detail is unavoidable in the work of manufacturing telephones, cable, switchboards and other telephone apparatus. The number of separate parts entering into all these products is 110,000; the number of separate parts in a certain well-known automobile is 3,000.

To see that each of these many parts fits into its proper place calls for constant watchfulness and skill in the men and women whose lifework it is. This ability is just one of the things Western Electric has developed in fifty-six years of experience.

Western Electric

SINCE 1869 MAKERS AND DISTRIBUTORS OF ELECTRICAL EQUIPMENT

This X-Ray shows tooth socket destruction by pyorrhea



Teeth that gleam

are often threatened by an unseen danger

TEETH that gleam with pearly whiteness are not safe from pyorrhea's attack unless the gums are firm and healthy. The danger is unseen because it starts *under* the gums. But an X-ray would reveal how quickly the infection spreads to the root sockets which support the teeth. The only way to check it is to ward off pyorrhea.

Tender, bleeding gums
warn you of pyorrhea's attack

Dental clinics since 1908 have proved that Pyorrhocide Powder is a most effective dentifrice for checking, as well as preventing, pyorrhea. Its tonic and stimulating qualities correct bleeding gums, strengthen tender gums, harden soft gums.

It keeps the teeth white and clean. It is medicated with Dentinol, a gum-tissue healing agent used by dentists in the treatment of pyorrhea.

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(Sole Distributors)
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Send me free sample of Pyorrhocide Powder and booklet.

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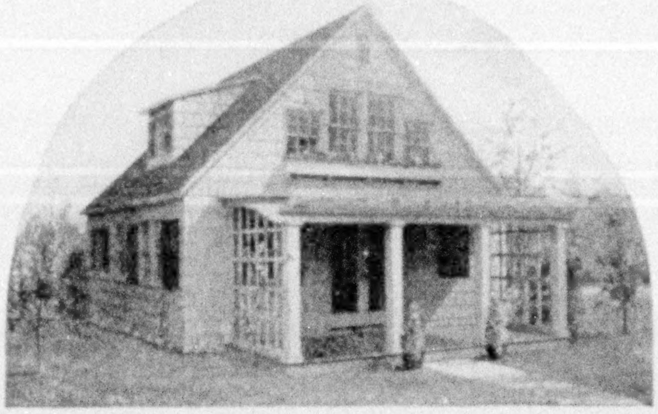

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WHETHER it is a substantially constructed home for all-year use or a cozy little bungalow for your summer weeks at the seashore or in the mountains, Bossert can help you to build at lowest cost. Our Ready-Cut Method eliminates waste and delay, saves you hundreds of dollars and gives you complete satisfaction on every requirement.

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GLADIOLUS lovers will find my 1925 catalog invaluable for successful selection and growing of gladioli. It contains many new Kunderd originations. Also my complete instructions. *Write for a copy and make selections now.*

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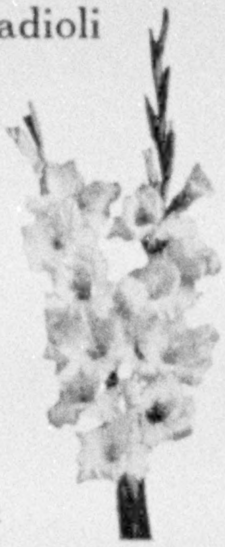
The Originator of the Ruffled and the Laciniated Gladioli



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THE GLEN SPRINGS

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Open All The Year. Wm. E. Leffingwell, Pres.

A Mineral Springs Health Resort and Hotel. The Pioneer American "Cure" for heart disorders. Sporty golf course.

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Designed for the Service Department, American Face Brick Association

This attractive house illustrates the character of the designs shown in our "Face Brick Bungalow and Small House Plans."

Think Before You Build

TO most people a home means an investment for a lifetime. A misstep is a serious matter. That is why it is worth while to think before you build. Many learn too late that they might have had the beauty and the permanence of a Face Brick house at an actual saving over a period of years. But each year—as home-builders appreciate more the relation of depreciation, up-keep, repairs, painting and fuel costs to home-owning—the number of Face Brick houses increases.

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Blooms from July to frost if you plant a few bulbs each month from April to July.

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Order Your Bulbs Now, so as to have them to plant when you begin making your garden.

Simple cultural directions with every package

Mail this advertisement with check, money order, cash, or stamps, and secure this splendid collection, sent prepaid to any point in the U. S. east of the Mississippi. **For points West and Canada, kindly add 25c. to cover cost of delivery.**

Our 1925 Spring Seed Annual sent on request

Stumpp & Walter Co

30 and 32 Barclay Street New York

How would you screen casement windows?

There is a trick to screening some windows properly and neatly. On casement windows, for example, ordinary screens won't do. They would be clumsy and in the way. Higgin-trained men know just which type of screen is best for the window, door or porch; and Higgin All-Metal Screens give you neatness and durability that mean lowest cost and greatest satisfaction through the years to come.

Send for this free book on modern screening of doors, windows and porches

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ALL METAL WINDOW SCREENS

THE HIGGIN MFG. CO., 505 Washington St., Newport, Ky.

The only belt with the Patented Comfort Feature, which combines absolute comfort, perfect trousers support, and prevents curling and binding at the sides.

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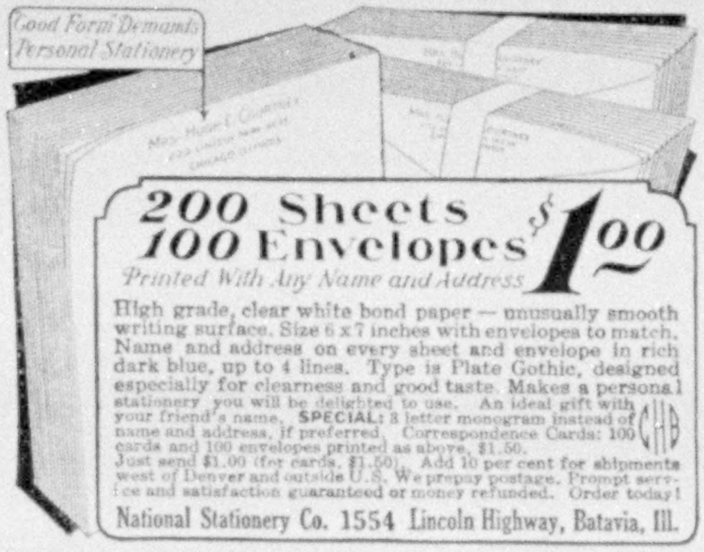

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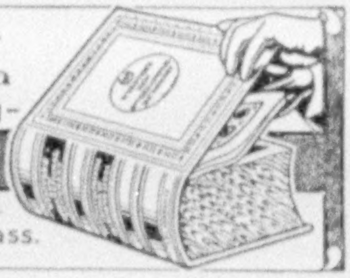

Announcement

of winners will be made in the May issue of this magazine! Look for it.

$1,000.00 in cash prizes

For NEW ways of using

G. Washington's

Delicious-Instant

Coffee

We had hoped to publish the names of the winners in this issue. However, owing to the number of recipes received, this was found impossible. From all parts of the country, as well as from foreign lands, recipes have come in.

The interest displayed has been really amazing as well as most gratifying. **With the co-operation of the housewives of a nation, we have definitely established *G. Washington's Coffee as an ideal flavoring for fine desserts and dainty dishes.***

On the other hand, we want to remind you that G. Washington's Coffee is, first and last, a beverage. A high-grade, absolutely pure coffee, refined from selected coffee beans.

G. Washington's assures you a delicious cup of coffee in an instant—anywhere—anytime. No boiling, no waiting, no waste, no grounds. No coffee pot or percolator needed. It is ready to drink when you add hot water.

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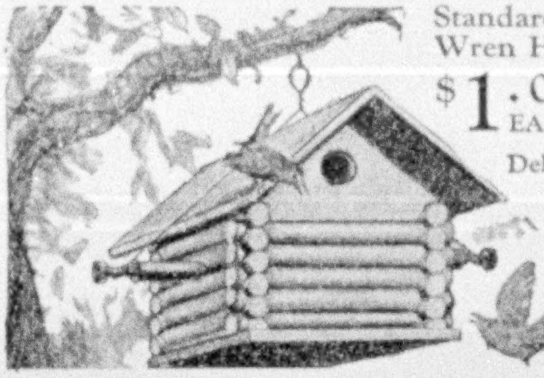
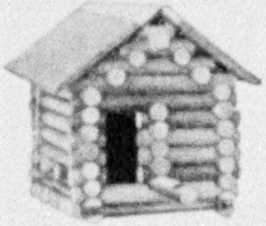
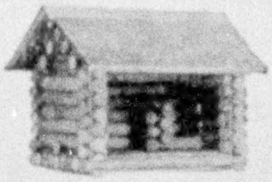


Standard Wren House
$1.00 EACH
Delivered

Build a House *that* Brings the Birds



Here is a bird house with a regular "front door."



This shelter has the wide side opening which the Robin demands.

The "Bungalow" is a most popular lure for the bird lovers.

The houses shown above can be made from the LINCOLN LOG Bird set $3

In addition to the Standard Wren House many other bird houses can be made from Lincoln Logs to attract a pleasing colony of feathered friends.

Lincoln Log Bird Houses with log floors and sides have a rustic appearance.

Hung in trees or under the eaves, fastened to a wall or on a pergola, they add a decorative touch whether in small yards or spacious grounds.

One of the distinct pleasures of the Lincoln Log Bird Houses is the opportunity of building them yourself from the ready-notched and stained logs.

The birds are now choosing their summer homes. Decide at once on the items you wish, then

Go to your dealer or send coupon to

John Lloyd Wright, Inc.
232 E. Erie St., Chicago

Lincoln Playhouse Large enough for the children to play in—so simple to build that they can have the fun of putting it up or taking it down unaided. No nails, everything notched to fit accurately together. Ideal indoors or out. ***Delivered $50***

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I enclose payment for items ordered below with understanding money will be refunded if not satisfactory.

—Standard Wren Houses, delivered	each	$1.00
—Special Equipment for bolting Wren Houses instead of nailing		.25
—Lincoln Log Bird Sets for building models shown to the left side or others in design book . .	each	3.00
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—Lincoln Playhouse Complete	each	50.00

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MADE IN
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Write Dept. 54, for your booklet, giving the name, also, of your local furniture dealer.

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GRAND RAPIDS MICHIGAN

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Write for this free Catalogue ("G") beautifully illustrated in colors, describing all kinds of nut and shade trees, fruits, berries, evergreens, roses, perennials and flowering shrubs.

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GLENWOOD NURSERY
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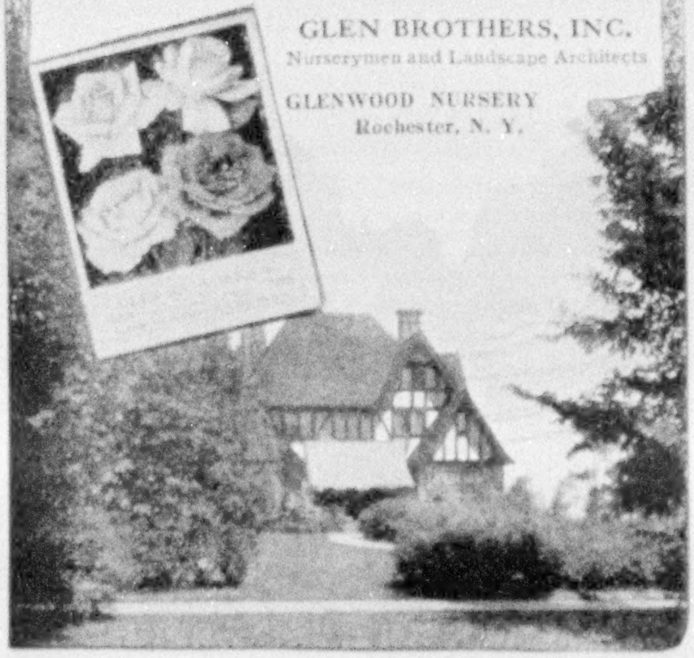
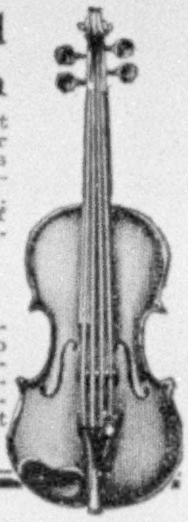


Violins Old and Modern



As exclusive violin experts, buying personally direct from individual European violin-makers, we offer you a selection of special values in both moderate and high grade violins. We also have a large collection of old violins at a wide range of prices. Liberal examination privilege—extended terms if desired. Special service on orders by mail—complete satisfaction guaranteed.

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New illustrated catalog shows our exclusive selection, with prices and details of our special offer to out-of-town customers. Also contains information and help to purchasers of violins as well as valuable hints on care and use. Sent free. Write for it today.

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In Your Study or Office

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For heavy pictures, clocks, etc., use

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"The Hanger with the Twist"

10c. Pkts. Everywhere

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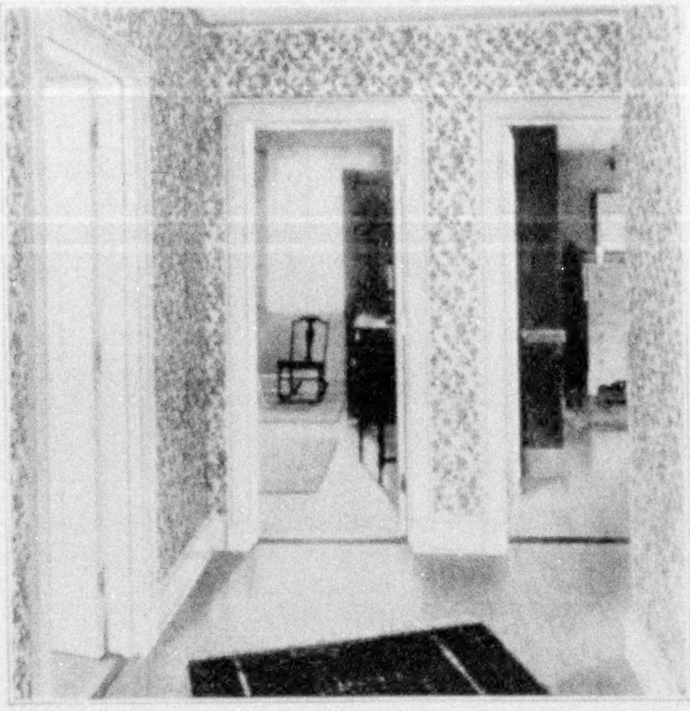

New floors for *old*

at less than carpet cost!

New floors make the whole home look new. You can cover your time-worn soft-wood floors or discard your old carpets for beautiful, colorful hardwood floors of Maple, Beech or Birch, at less than the price of new carpets.

Investigate the possibilities of using the special ⅜-in. thickness of these floorings which are so tough-fibred and tight grained that they outwear the home. Learn the fascinating opportunities of color harmony.

Write for the facts—"Color Harmony in Floors," "The Floors for Your Home" and "New Floors for Old" are interesting to everyone who plans to build or remodel.

Write — and receive them with our compliments.

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Guaranteed Floorings

The letters **MFMA** on Maple, Beech or Birch flooring signify that the flooring is standardized and guaranteed by the Maple Flooring Manufacturers Association, whose members must attain and maintain the highest standards of manufacture and adhere to manufacturing and grading rules which economically conserve every particle of these remarkable woods. This trade-mark is for your protection. Look for it on the flooring you buy.

MFMA

Floor *with* Maple
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Go Back

to coffee—all you want Coffee without caffeine

This is to people who must stint on coffee, because the caffeine affects heart, nerves or kidneys. Or to people forced to substitutes. Or to people who dare not drink coffee at night.

Science has found a way to take the caffeine out of coffee. Just the caffeine—that is all. No flavor, no aroma is affected. We open the pores of the raw coffee bean and remove the caffeine alone.

This harmless coffee is called Kaffee Hag. It is an exquisite blend. It is superlative coffee at its best—and nothing else.

Caffeine is a tasteless drug. Its removal does not change the taste. All the good qualities remain. It is coffee at its best. For only the harm is gone.

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Think what Kaffee Hag means. A coffee rich in all coffee joys. So flavory that the finest hotels now serve it. Yet all can drink it to their hearts' content, without a thought of harm.

Let us send a ten-cup package for someone in your home to try. Mail this coupon now.

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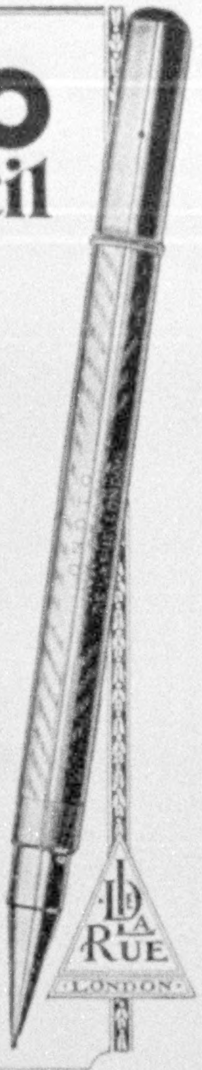
the Ink Pencil



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Sani-Flush cleans and purifies the toilet bowl. It cleans the hidden, unhealthful trap, which cannot be reached by other means. It destroys all foul odors.

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242 full-color portraits of flowers and plants by Mary E. Eaton, the world's leading painter of flowers; 8 full-page color microphotographs of grasses by E. J. Geske; many monotint engravings; 250 pages.

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By John Oliver La Gorce and Other Authorities

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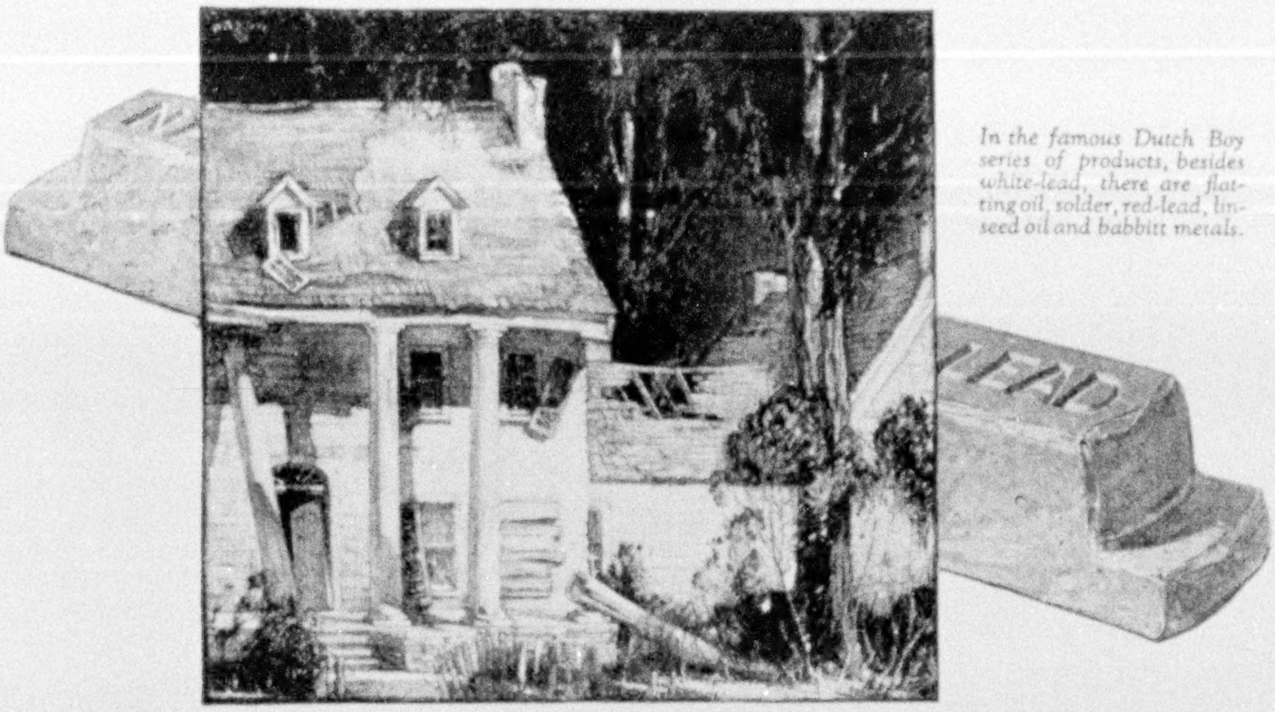

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the fire extinguisher

WHEREVER unpainted surfaces are exposed to the atmosphere, they burn just as surely as when a match is applied. This burning, or combustion, involves oxidation, during which oxygen is taken from the surrounding air. There are three kinds of combustion: almost instantaneous, or explosion; rapid, or fire; and slow, or rot. Slow combustion is destroying millions of houses, rotting wooden porch columns, window sashes, and exterior walls.

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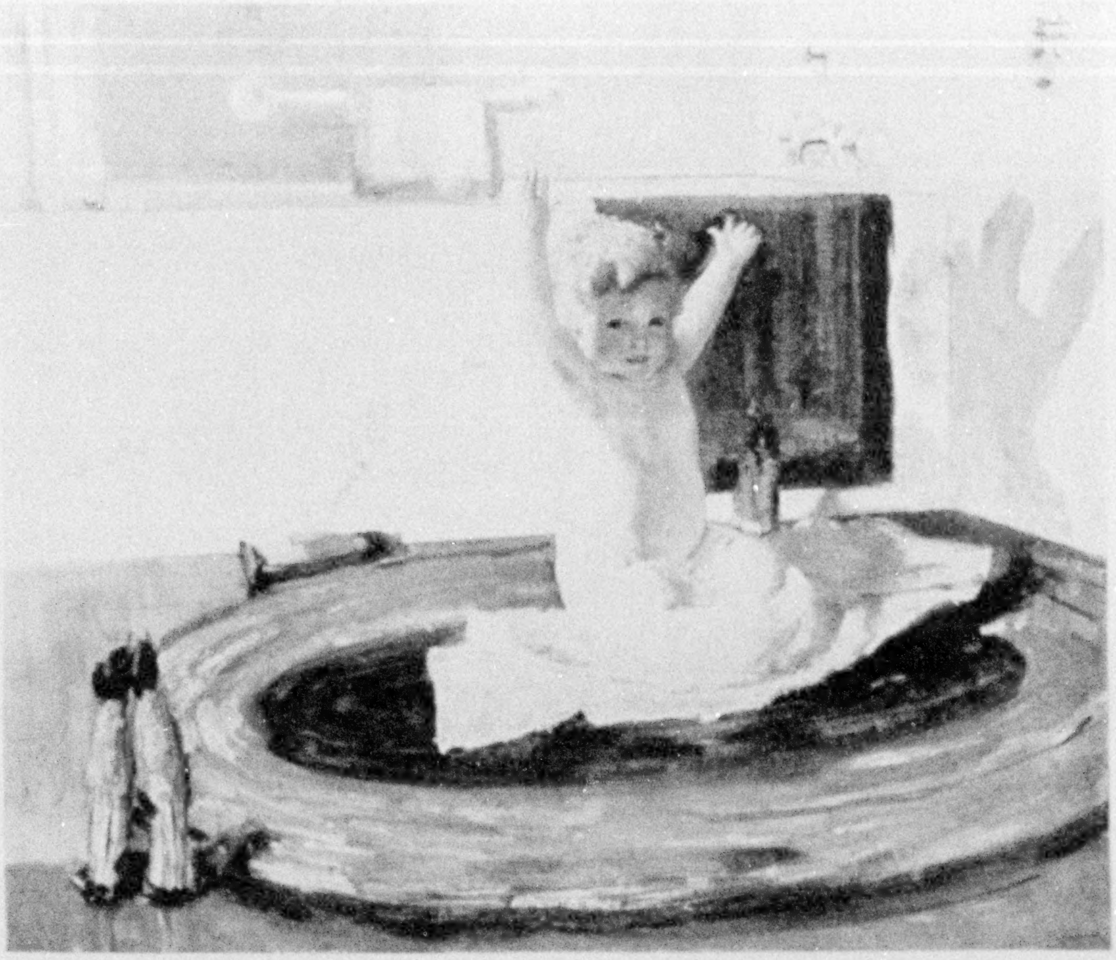

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Kohler Co., *Founded 1873*, Kohler, Wisconsin
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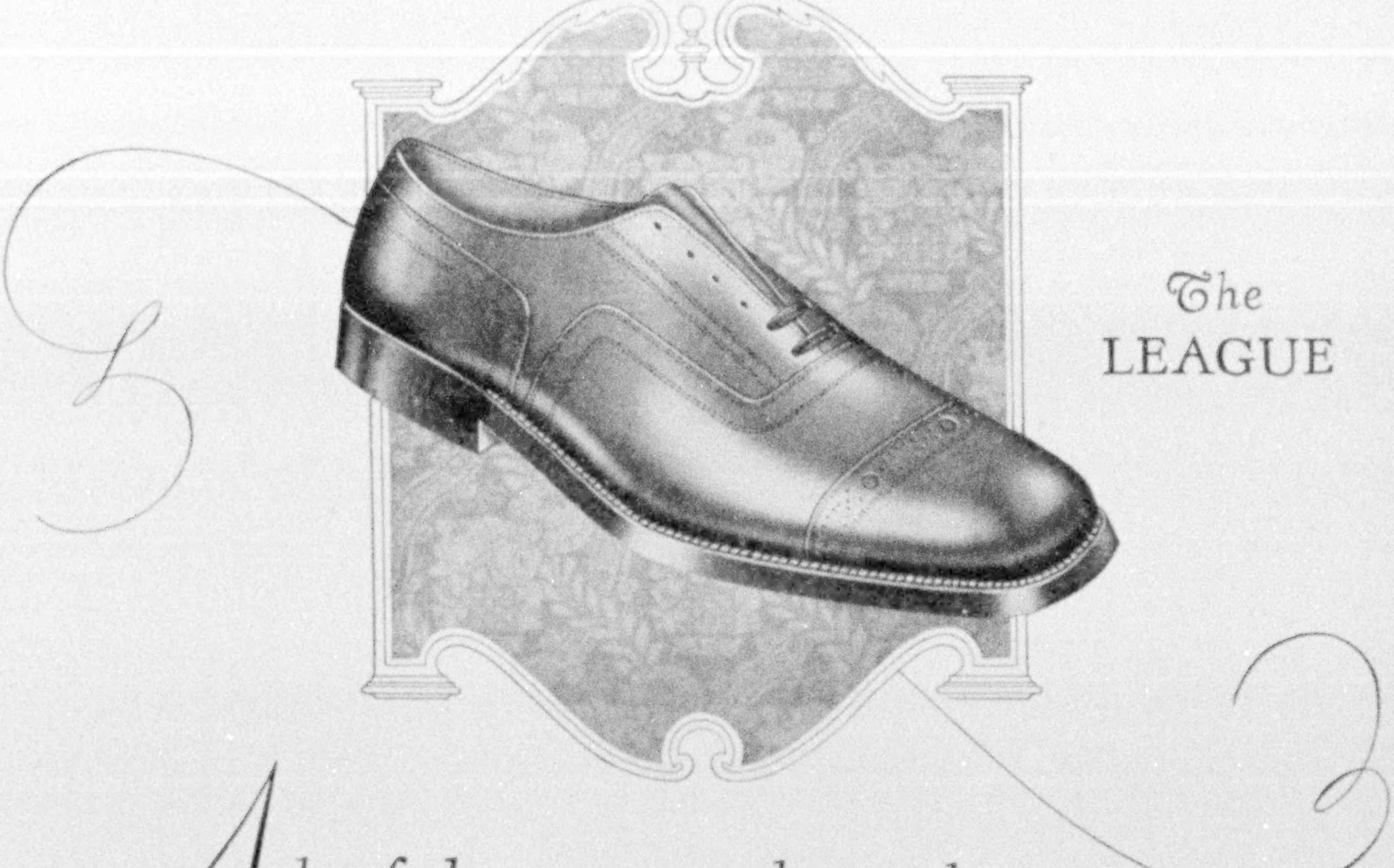
KOHLER OF KOHLER

Enameled Plumbing Ware



The
LEAGUE

Ask of the rugs—about shoes

The rich Orientals that adorn fine homes...the plainer rugs in executive offices...the banker's, the great editor's, the Governor's—ask any of these rugs about the shoes that walk on them.

So many of them—if they could talk—would tell you of men who wear Banister Shoes.

Not that shoes of themselves carry men up to success. But successful men carry their niceties of choice and judgment even down to shoes. They demand the last word in appearance and comfort.

Therefore, for eighty years gone by, for now, and for untold years to come, these shoes have been, are, and will be chosen by such men.

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JAMES A. BANISTER CO.
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BANISTER
Shoes

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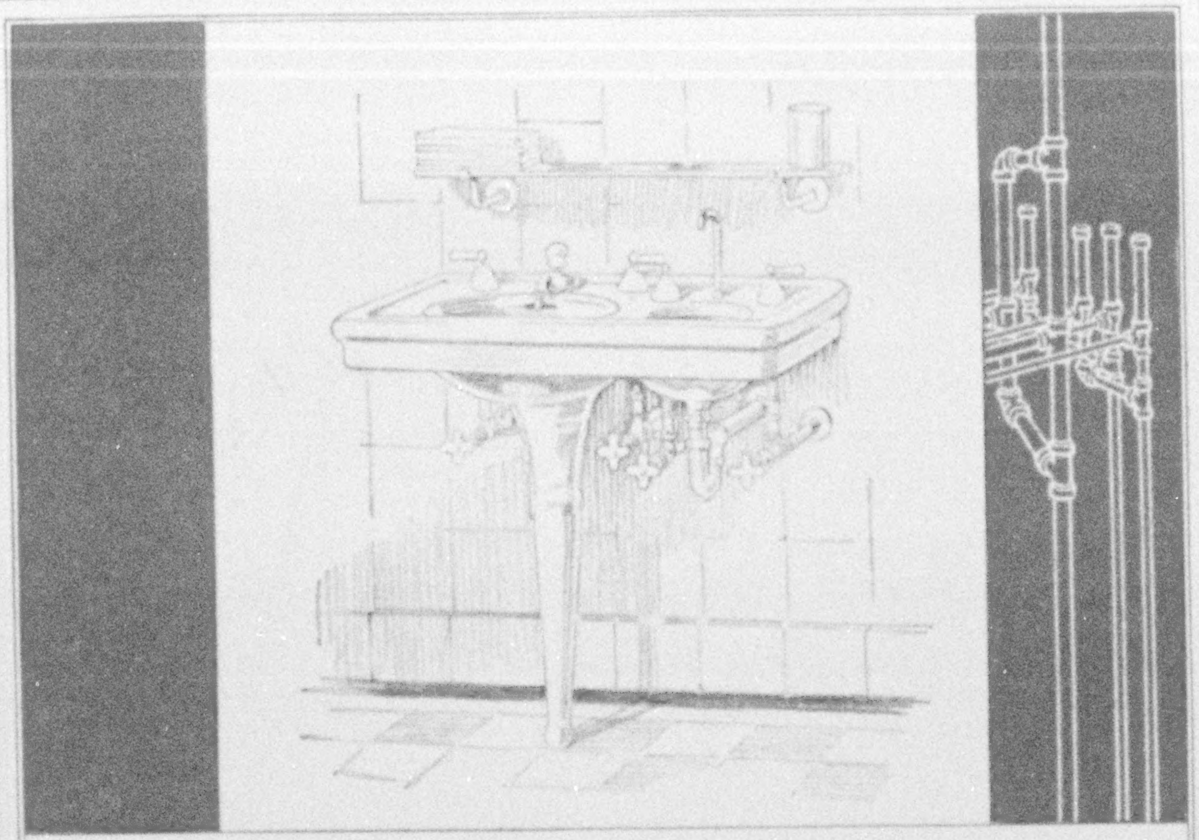

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